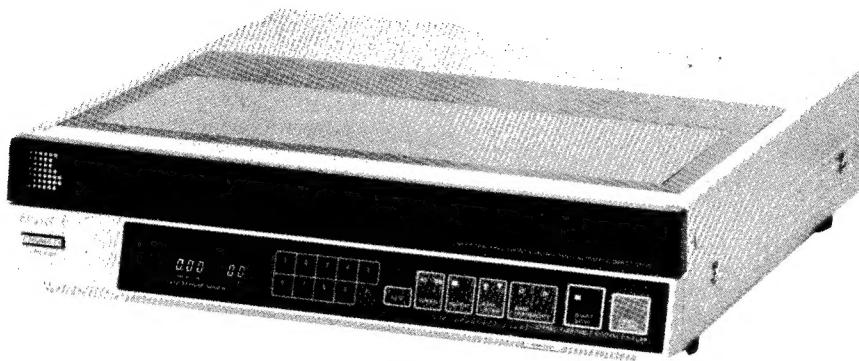


PS-FL99

SERVICE MANUAL

*AEP Model
UK Model
E Model*



SPECIFICATIONS

Turntable

Platter	29 cm (11½ in.), aluminum-alloy diecast
Motor	Linear torque BSL (brushless and slotless) motor
Drive system	Direct drive
Control system	FG servo control system
Speed	33½ rpm, 45 rpm
Wow and flutter	0.03% (WRMS)*, 0.035% (WRMS)
Signal-to-noise ratio	75 dB (DIN-B)
Automatic system	Loading, lead-in, return, reject, repeat, tonearm up/down, record size detection, RMS, AMS

Tonearm

Type	linear tracking tonearm
Pivot-to-stylus length	75 mm (3 in.)
Overall arm length	170 mm (7½ in.)
Tracking error	±0.1°
Tracking force adjustment range	1.25 ±0.25 g
Cartridge	plug-in type, 6 g

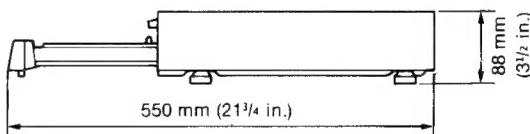
Cartridge XL-250G

Type	Moving magnet type
Frequency response	10 Hz to 20,000 Hz
Channel separation	23 dB at 1 kHz
Output voltage	5 mV at 1 kHz, 5 cm/sec., 45°
Load impedance	50 to 100 kilohms
Tracking force	1.0 to 1.5 g (1.25 g recommended)
Stylus	Sony ND-250G
Weight	6 g

* This new measuring method concerns only the turntable assembly, including the platter. It excludes wow and flutter caused by the tonearm, the cartridge, or the record. Measured by obtaining signal from magnetic pick-up head.

General

Power requirements	AEP model: 220 V ac UK model: 240 V ac E model: 110–120 or 220–240 V ac adjustable
Power consumption	50/60 Hz 15 W
Dimensions	Approx. 355 × 88 × 380 mm (w/h/d) (14 × 3½ × 15 in.) including projecting parts and controls



Weight

Approx. 7 kg (15 lbs 7 oz), net
Approx. 8.3 kg (40 lbs 6 oz), in shipping carton

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

STEREO TURNTABLE SYSTEM
SONY®



AUD

FEATURES

Unique modular turntable system

When you touch the OPEN/CLOSE key the turntable module will smoothly slide out. Other audio components can be positioned on top of the turntable cabinet.

Servo-controlled linear tracking tonearm

A linear tracking tonearm is designed to duplicate the movement of the head which cuts the record master.

Compared with a pivoted tonearm, a linear tracking arm has a very small tracking error (which means greatly reduced harmonic distortion) and almost no pressure on the inside wall of the groove (which means improved tracking ability and channel separation).

Programmed play

The RMS (Random Music Sensor), AMS (Automatic Music Sensor) and skip function allow you to program record play as you like.

RMS: for playing the selections on one side of the record in a desired sequence.

AMS: for starting record play from the desired selection.

Skip function: for skipping selections to the desired selection.

A microcomputer controls three motors

The movement of the turntable, the tonearm and the turntable module is controlled by a microcomputer. When you press the START/STOP key, the module will close, the turntable will rotate and the tonearm will lower onto the record.

Fully automatic system

With the module closed, automatic record play and tonearm up/down are operated by the "feather-touch" function keys on the front panel. The record size is automatically set by a photo-sensor system. If no record is on the turntable, the tonearm will not descend but will automatically return to the arm rest. A muting system activates when the tonearm is lifted and deactivates after the tonearm lowers onto a record so there is no need to turn the amplifier volume down every time a stylus is placed on a record.

Linear torque BSL motor

Direct drive system with Sony's unique BSL (brushless and slotless) motor which has an extremely low noise level and whose smoothness virtually eliminates wow and flutter. Its high torque assures a quick start to $3\frac{1}{3}$ rpm after only a half revolution.

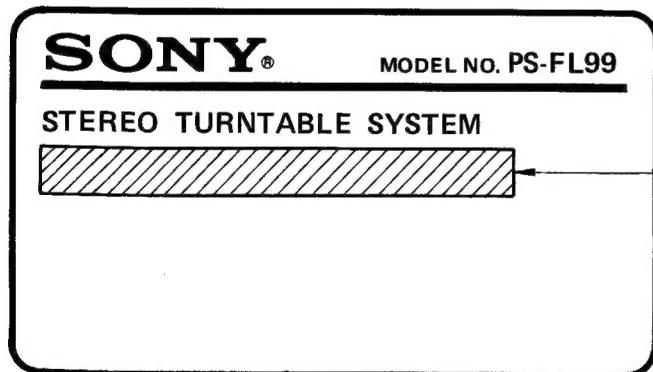
Synchronized operation with the Sony cassette decks

When the tonearm lowers onto the lead-in groove of a record, the cassette deck stand-by mode is released and the record mode assumed.

When play finishes, the cassette deck is automatically set first in the record muting mode, then in the pause mode. This synchronized operation is possible with Sony cassette decks equipped with a four-pin remote control jack which is connected with the Sony RM-65 synchro remote control unit.

Wireless remote control operation

Using the optional ST-V7/V7L system control tuner, various operations—power on/off, start/stop play, tonearm up/down—can be remotely controlled.



AEP model: 220 V 50/60 Hz 15 W
UK model: 240 V 50/60 Hz 15 W
E model: 110-120 V, 220-240 V 50/60 Hz 15 W

NOTES ON REPAIR

- In this set, the voltage is applied to the power supplying line (± 21 V) even if the POWER switch is turned OFF. When repairing the unit, unplug the power cord with the POWER switch ON (to discharge electrolytic capacitor in the power supply circuit).

— When removing the bottom plate —

- When the module closes, the photo detector searches over the record to detect the record size (30 cm, 25 cm or 17 cm) and sense how many selections are on the record by detecting the blank spaces between selections, and then this model is ready for AUTO play. Therefore, when removing bottom plate, record size and the number of selections can not be detected because of mechanical reasons and there will be no operations even if the START / STOP button is pressed. Perform MANUAL play with ARM TRANSPORT ($\triangleleft, \triangleright$), ARM LIFTER ($\blacktriangledown, \blacktriangledown$) button in order to check the boards.

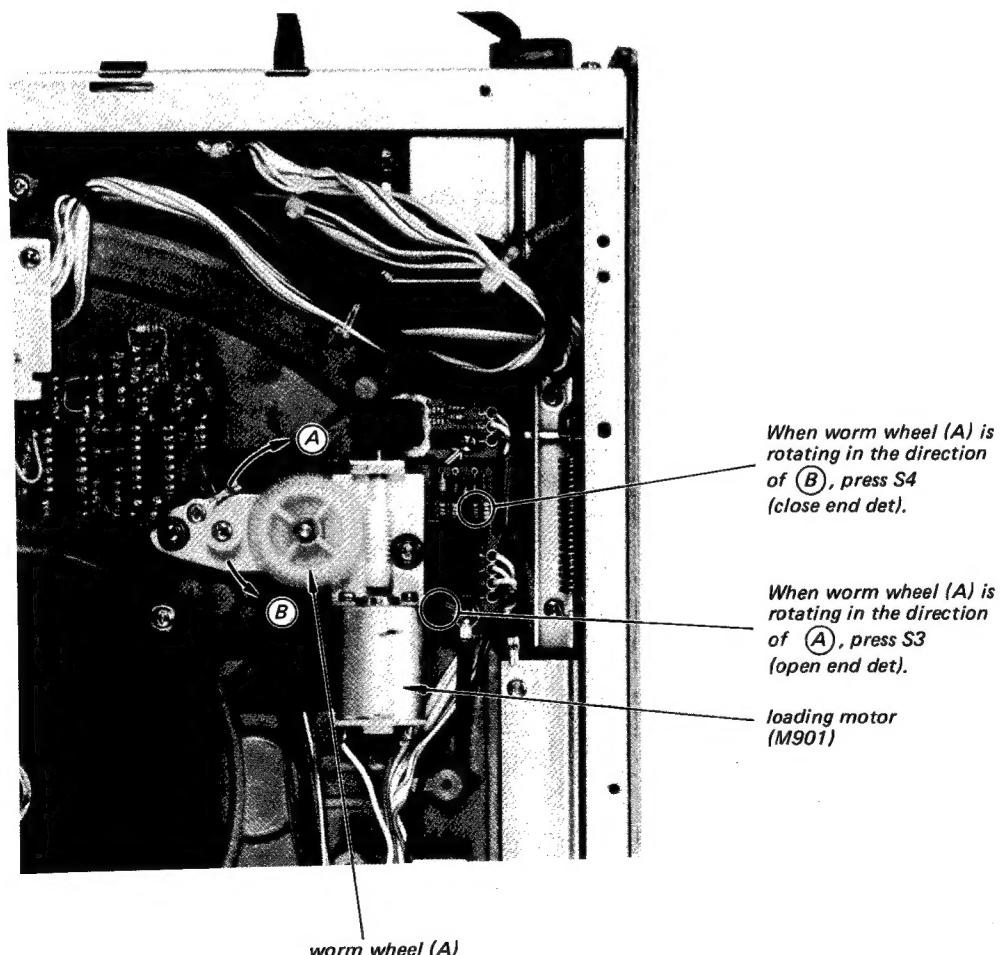
- When POWER switch (S1) turns ON with bottom plate removed, loading motor (M901) continues to rotate and does not stop. But, it is not broken.

1. When POWER switch (S1) turns ON with TABLE END switch (S3 or S4) pressed, loading motor (M901) does not rotate.

2. When TABLE END switch (S3 or S4) is pressed according to the rotating direction of loading motor (M901), the motor stops even if the motor is rotating (See the figure below).

3. System control IC checks the condition of TABLE END switch by pressing ARM TRANSPORT ($\triangleleft, \triangleright$), ARM LIFTER ($\blacktriangledown, \blacktriangledown$), START/STOP button.

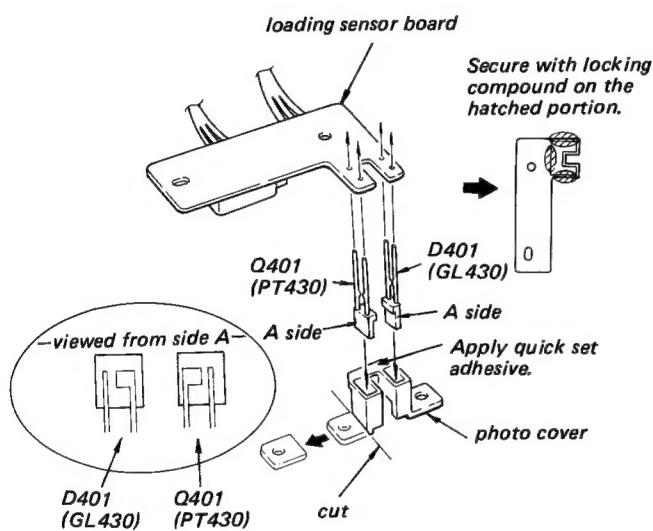
When operation buttons are pressed, be sure to keep TABLE END switch (S3 or S4) pressed. If not, key input can not be found.



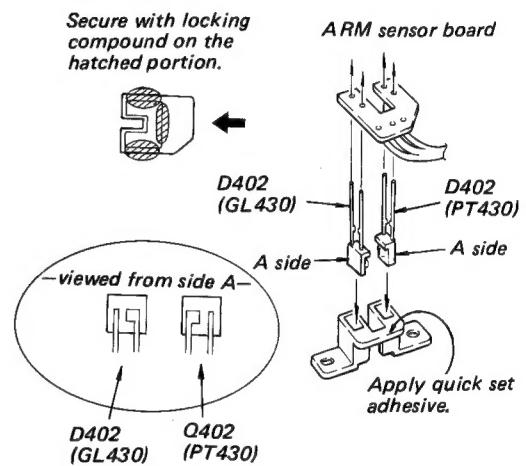
CAUTION ON REPLACING PHOTO TRANSISTORS (Q401, 402), LED (D401, 402) FOR BLANK SPACE POSITION AND ARM POSITION DETECTION.

- Be careful of the mounting direction on replacing photo transistors (Q401, 402), LED (D401, 402).
- After replacing, secure photo cover to the board by applying quick set adhesive and then locking compound.

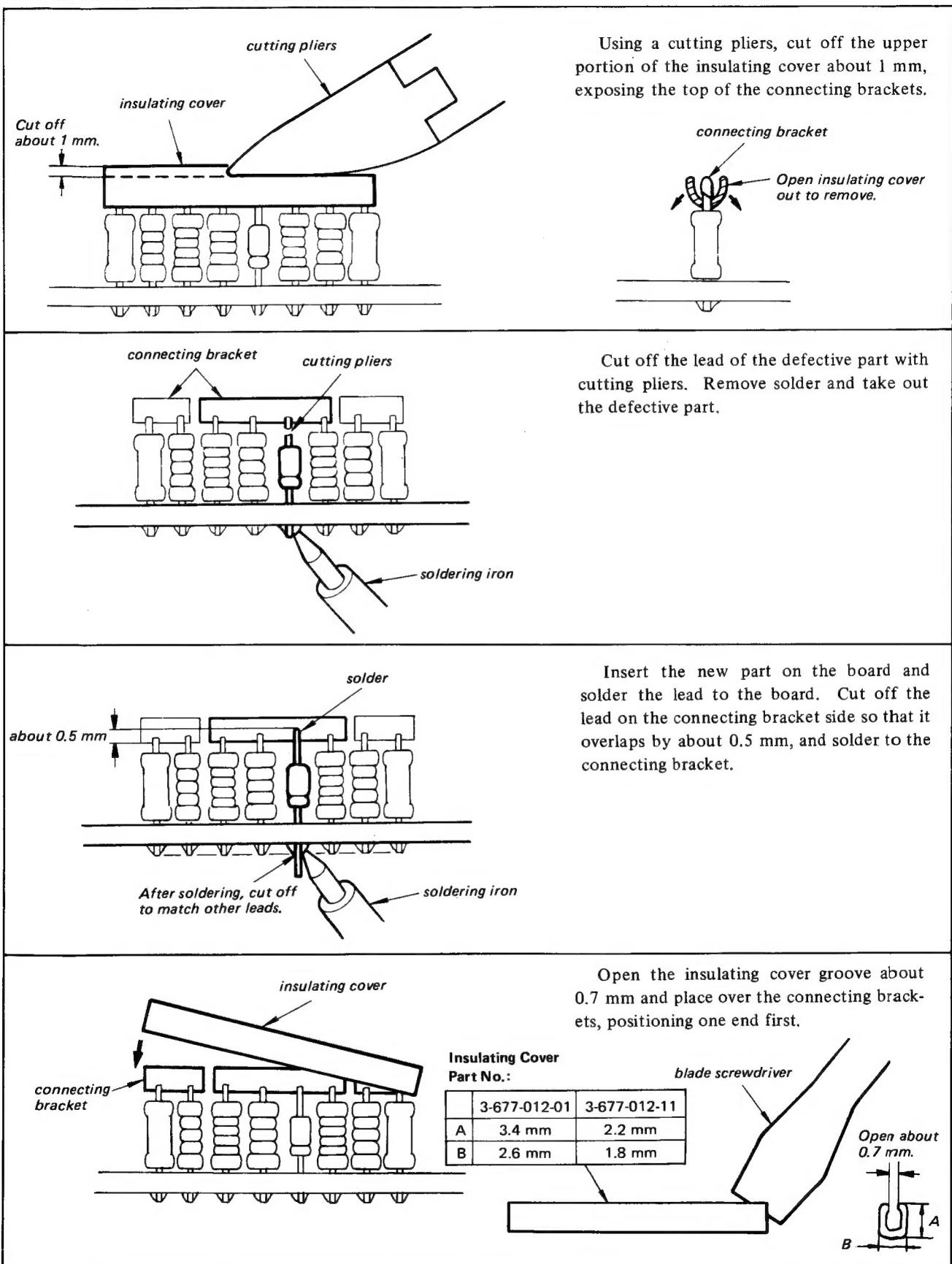
For blank space position detection (Q401, D401)



For arm position detection (Q402, D402)

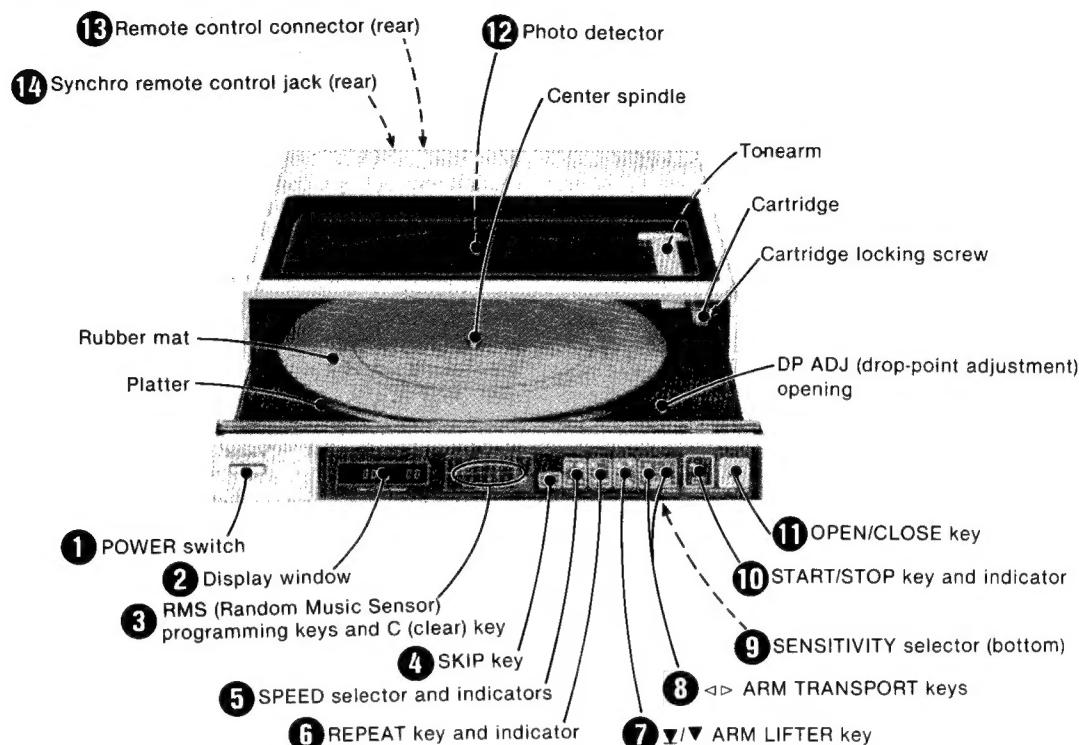


REPAIR METHOD FOR HYBRID CIRCUIT BLOCK



LOCATION AND FUNCTION OF CONTROLS

The photo below shows the assembled turntable.



① POWER switch

Depress to turn on the turntable. To turn the turntable off, press it again.

② Display window

The elapsed playing time of the selection, the number of the selection being played, the programmed selections for RMS play, etc. are displayed in this window. See page 11.

③ RMS (Random Music Sensor) programming keys and C (clear) key

Used for programming the selections to be played in the desired sequence. See "RMS play" on page 10.

④ SKIP key

Press this key to skip from the selection being played to the next selection. See "To skip to the desired selection while the record is playing" on page 10.

This key is also used for AMS (Automatic Music Sensor) play. See "AMS play" on page 10.

⑤ SPEED selector and indicators

When the power is turned on, the speed is automatically set to 33 $\frac{1}{3}$ rpm, and the "33" indicator lights up.

Press this key when a 45 rpm record is to be played, the "45" indicator lights up. Press it again for a 33 $\frac{1}{3}$ rpm record.

⑥ REPEAT key and indicator

Press this key to repeat play. Repeat play continues until this key is pressed to release it. During RMS play, only the programmed selections will be repeated in the programmed sequence.

⑦ ▲/▼ ARM LIFTER key

This key lifts and lowers the tonearm. When the tonearm is on the arm rest, this key is not operative.

⑧ ▲/▼ ARM TRANSPORT keys

To move the tonearm inward, press the ▲ key, and to move outward, the ▼ key. The tonearm is raised and continues to move while the key is pressed. The tonearm will stop when the key is released. For fine adjustments, press and immediately release the appropriate key.

⑨ SENSITIVITY selector (on the bottom)

Normally set this selector to M.

When the number of the selections detected is not correct, set the selector to either H or L. See page 7.

⑩ START/STOP key and indicator

Press to start the record playing. The □ indicator on the key will light up. To stop during play, press it again.

⑪ OPEN/CLOSE key

With one touch of this key the turntable module automatically opens for loading a record. With another touch the module automatically closes.

⑫ Photo detector

Detects the record size (30 cm, 25 cm and 17 cm) and how many selections are on a record, by searching for blank spaces between selections when the module closes.

See page 7.

⑬ Remote control connector (rear)

Connect the remote control cord of the optional ST-V7/V7L system control tuner. For details, read the instruction manual for the system control tuner.

⑭ Synchro remote control jack (rear)

Synchronized recording from disc to tape is possible on specified Sony cassette decks by using the optional RM-65 synchro remote control unit.

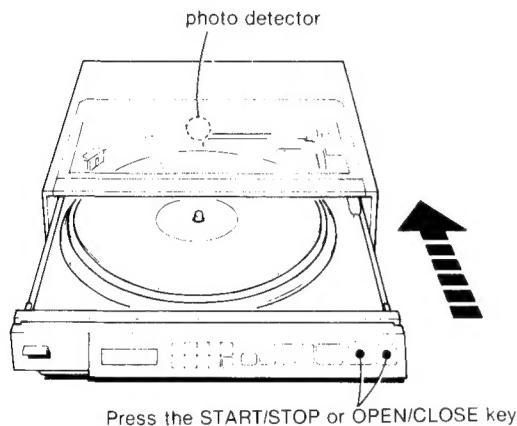
HOW RECORD SIZED AND SELECTIONS ARE DETECTED

When the module closes, the photo detector searches over the record to detect the record size (30 cm, 25 cm or 17 cm) and sense how many selections are on the record, by detecting the blank spaces between selections. The selection number indicator changes rapidly from 01 to the number of the selection contained on the record. Up to 15 selections can be counted. The data is input into the memory of the microcomputer incorporated.

This data will be erased from the memory when the OPEN/CLOSE key is pressed to open the module or when the POWER switch is turned off.

Special records

The photo detector cannot operate with transparent records, non-standardized records and records of an unusual shape or color (red or blue). Play these record manually.



Press the START/STOP or OPEN/CLOSE key

Caution

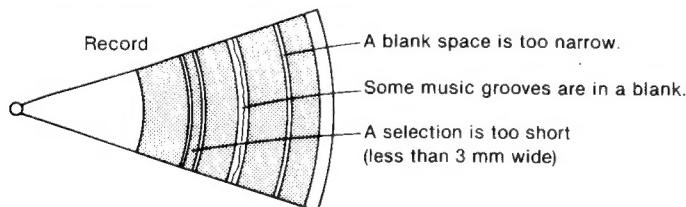
Do not press the OPEN/CLOSE key while the module is closing. If the key is pressed at such a time, the module will slide out and it will not slide back in, even if the OPEN/CLOSE key is pressed again. In this case, after the module has been opened completely, press the OPEN/CLOSE key again.

SENSITIVITY selector

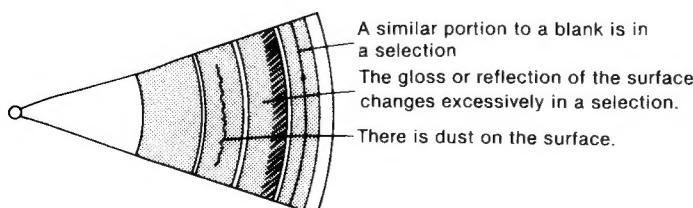
Since the photo detector searches for the blank spaces on a record, it cannot operate correctly if the blank spaces and music grooves are not in good condition. As a result, the RMS, AMS and skip function may malfunction.

If the number of the selections detected is different from the number of the selections actually existing, change the position of the SENSITIVITY selector on the bottom of the unit to either H (high) or L (low).

Why too few selections are detected :

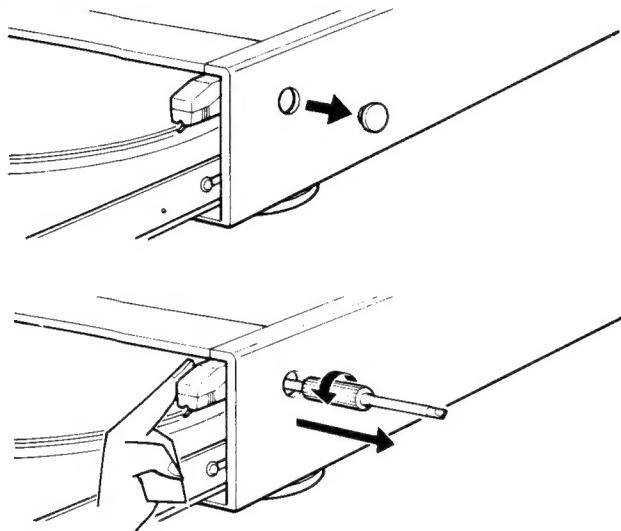


Why too many selections are detected :

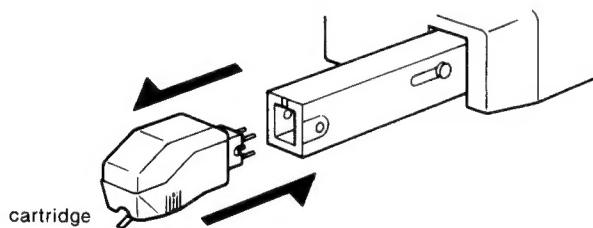


INSTALLING A CARTRIDGE OTHER THAN THE ONE SUPPLIED

- 1 Press the POWER switch, then press the OPEN/CLOSE key to open the module.
- 2 Remove the cap on the right side, insert the supplied screwdriver through the hole, and remove the cartridge locking screw with the screwdriver.
- The screw can be removed, clinging to the head of the screwdriver.



- 3 Remove the rubber mat and platter.
- 4 Press the \triangle key to move the tonearm for easier installation. Then turn the POWER switch off.
- 5 Remove the old cartridge and plug the new one into the tonearm.



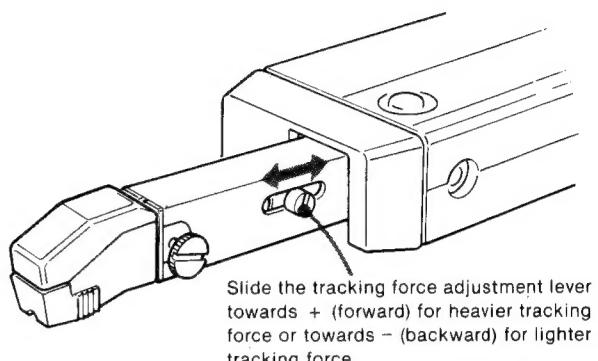
- 6 Depress the POWER switch (\triangle ON), and the tonearm will return to the arm rest.
- 7 Tighten the cartridge locking screw to the tonearm, by inserting the screwdriver holding the screw through the hole and turning it clockwise.
- 8 Replace the cap, platter and rubber mat.

The **TP** label indicates that a cartridge is a standardized plug-in type.

TRACKING FORCE FINE ADJUSTMENT

The tracking force has been correctly adjusted at the factory. Make fine adjustment only when the tracking force is so light that the stylus skips grooves.

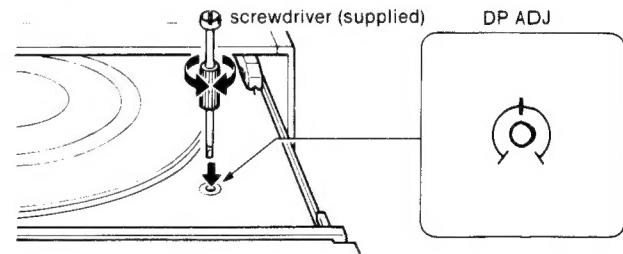
- 1 Depress the POWER switch, then press the OPEN/CLOSE key to open the module.
- 2 Press the \triangle key to move the tonearm toward the center spindle.
- 3 Slide the tracking force adjustment lever.



TONEARM DROP-POINT ADJUSTMENT

The tonearm's drop-point during auto play, AMS play or RMS play has been adjusted at the factory. Adjust this if the stylus does not lower correctly at the beginning of the desired selection.

- 1 Press the OPEN/CLOSE key to open the module.
- 2 Insert the supplied screwdriver into the DP ADJ opening. To move the drop-point inward, turn the screw clockwise. To move the drop-point outward, turn the screw counterclockwise. Do not turn it so far counterclockwise that the stylus tip cannot make contact with the record.



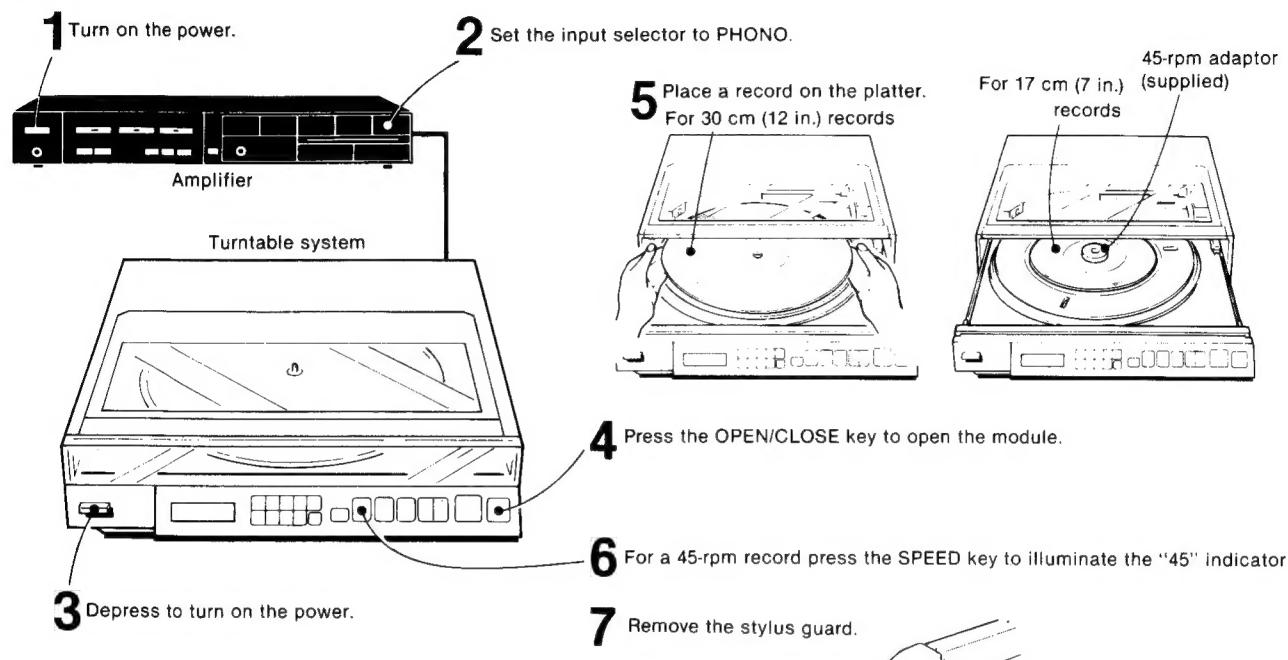
- 3 Check if the drop-point is correctly adjusted by lowering the tonearm to the beginning of a selection in the middle of the record, using the AMS function. (Checking the drop-point for the first selection is not sufficiently accurate.)

If the drop-point is correct for one selection, it will also be correct for all the selections.

RECORD PLAYING

PREPARATION

This turntable's photo detector detects the record size and the number of the selections on the record when the module closes. Therefore after turning the power on, be sure to press the OPEN/CLOSE key to open the module so that the detector is on standby.



Notes

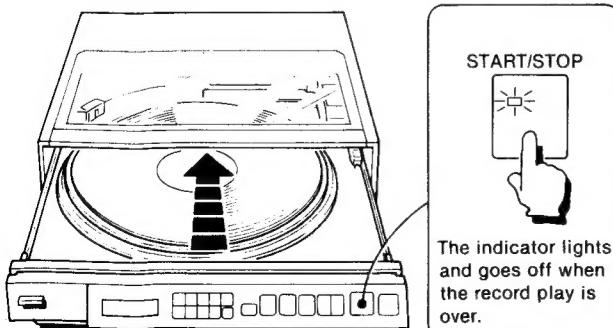
- If the turntable causes interference to radio and television reception, turn off the turntable or move the turntable away from the receiver.
- A badly warped record cannot be played because it will rub against the tonearm.

AUTO PLAY

—To begin record play from the beginning of the record

The record size is detected and playback starts from the beginning of the first selection for either 30 cm (12 inch), 25 cm (10 inch) or 17 cm (7 inch) records.

- 1 Press the START/STOP key. The module closes and play will begin.



The selection number being played and the elapsed playing time from the beginning of the selection (in minutes and seconds) are displayed in the display window.



When the tonearm reaches the end of the record, the turntable will stop and the tonearm will automatically return to the arm rest.

Notes

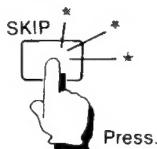
- Transparent records, records of an unusual shape or color (red or blue), or non-standardized records cannot be played automatically. To play these records, follow the instructions on page 11.
- Turn off the POWER switch after the tonearm returns to the arm rest. If the POWER switch is turned off while the tonearm is returning to the arm rest, when you press the POWER switch the next time the tonearm will return to the arm rest. While the tonearm is moving, the START/STOP key is not activated.

RMS (RANDOM MUSIC SENSOR) PLAY

AMS (AUTOMATIC MUSIC SENSOR) PLAY

—To begin record play from the desired selection

- 1 Press the OPEN/CLOSE key to open the module, put on a record and select the correct record speed.
- 2 Press the SKIP key repeatedly until the number of the selection from which you want to start play is displayed. Each time the SKIP button is pressed, the selection number display changes up 1, as far as 15, then resets to 01.



Selection number

- 3 Press the START/STOP key. The module closes, the tonearm searches for the preset selection and play begins.



While searching



While playing

Elapsed playing time lights up.

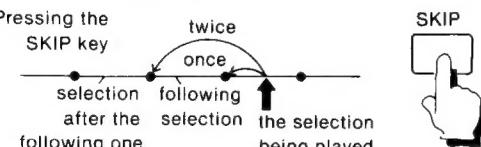
Note

If selection number which does not exist (for example, "08" for a record which contains only 7 selections) is input, the "E" (error) indicator appears and flashes several times. In this case, input an appropriate selection number.

TO SKIP TO THE DESIRED SELECTION WHILE THE RECORD IS PLAYING —Using the SKIP function

- 1 Press the SKIP key repeatedly during play until the number of the desired selection is displayed.

Each time the SKIP key is pressed, the next selection in advance is displayed, and when the last selection has been played, the display reverts to 01.



The tonearm will lift up, search for the preset selection and play will start automatically.

Note

The SKIP function is inoperative while the tonearm is in the raised position after the ▲/▼ key or the ▲▼ key has been pressed or while the record is playing with the module open.

You can play selections on one side of the record in the desired sequence, which has been programmed using the RMS keys.

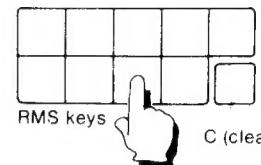
- 1 Press the OPEN/CLOSE key to open the module, put on a record and select the record speed.

- 2 Press the RMS keys in the sequence in which you want to listen to the selections.

The programmed selection numbers are displayed from left to right in the order in which they are to be played. Up to 8 selections can be programmed.



The selections will be played in this order.



C (clear) key

- 3 Press the START/STOP key.

The module closes and play begins from the first-programmed selection.

While searching



blinks rapidly

While playing



blinks slowly

At the end of the last-programmed selection, the turntable will stop rotating and the tonearm will return to the arm rest automatically. If you wish to play the same selections in the same sequence again, press the START/STOP key.

To change the programmed sequence

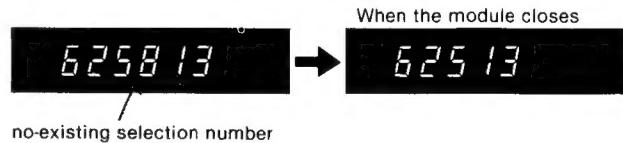
Press the C key when the tonearm is on the arm rest. The display will change to 0.00 and the programmed sequence will be erased. Then press the RMS keys again in the desired sequence.

To add to the programmed sequence

Just press the desired RMS key(s) during play or when the tonearm is on the arm rest. (While the tonearm is searching for a selection, the RMS keys are not operative.) Up to 8 selections can be programmed.

Automatic editing function of the RMS program

If an RMS key whose number exceeds the existing selections is pressed with the module open, the display of that number will disappear automatically when the module closes.



When the module closes

If an incorrect RMS key is pressed with the module closed, the number of the key will not be displayed.

This is an automatic editing function of the RMS program.

If the pressed RMS keys are all incorrect, the "E"(error) indicator will flash several times, then go out. In this case press the correct RMS keys.

To cancel the RMS program

Press the ▲▼ key or the OPEN/CLOSE key during play, or press the C key when the tonearm is on the arm rest. The display will change to 0.00 and the programmed sequence will be erased.

DISPLAY WINDOW

TO LIFT UP THE STYLUS DURING RMS PLAY

To lift up the stylus for a moment and then start playing from the same point, press the **▲/▼** key. To lower the tonearm onto the record, press the **▲/▼** key again.

TO STOP DURING RMS PLAY

Press the START/STOP key. The tonearm will return to the arm rest and the turntable will stop rotating. When the START/STOP key is pressed again, the RMS play will restart.

TO SKIP SELECTIONS DURING RMS PLAY

Press the SKIP key during play. Each time the SKIP key is pressed, the next selection ahead is played.

TO REPEAT RMS PLAY IN THE PROGRAMMED SEQUENCE

Press the REPEAT key either before or after starting RMS play. At the end of the last-programmed selection, the tonearm will return to the first-programmed selection automatically, then play will restart.

To stop during repeat play, press the REPEAT key. When the last-programmed selection has been played, the tonearm will return to the arm rest and repeat function will be cancelled.

If you press the START/STOP key during repeat play, play will stop immediately, the tonearm will return to the arm rest and the repeat function will be cancelled.

Time counter and selection number indicator

Normally, the time counter and the selection number indicator are displayed in the display window.

Time counter



min. sec. Selection number indicator

Time counter : Indicates the elapsed playing time of the selection being played in minutes and seconds. The counter starts counting the time at the beginning of the selection (in auto play and RMS play) or at the point where the tonearm is lowered onto the record (in manual play).

Selection number indicator : Remains lit to indicate the number of the selection being played, and flashes while the tonearm is searching for the selection.

When the record is being played with the module open, this indicator does not operate.

RMS program indicator

When the RMS key is pressed, the display switches to the RMS program indicator.



The selection number are displayed from left to right in the programmed sequence. When the tonearm is searching for the selection, the number flashes rapidly. When the selection is being played, the number flashes slowly.

Error indicator



The "E" (error) indicator appears and will disappear after flashing several times in the following cases.

- When the START/STOP key is pressed, but there is no record on the platter.
- When the START/STOP key is pressed before the module has opened once.
- When inappropriate selection numbers are set for AMS or RMS play with the module open, and the START/STOP key is pressed.

Note

The time counter indication may be slightly different from the time indicated on the record jacket, as the former includes the time equivalent to the blank space between the selections.

SECTION 1

OUTLINE

1-1. CIRCUIT DESCRIPTION

SYSTEM CONTROL MICROCOMPUTER IC301

Conditions for IC301 beginning operation:

1. 5 V supplied to power supply pin (41).
2. Reset pin (7) goes from 0 V to 5 V.
3. Clock oscillation pins (1, 42) are oscillating at 800 kHz.
4. Check input in other operation modes.

Pin No.	Pin Name	Function
1	XTAL (I/O)	Clock oscillation pin.
2	C0 (O)	Marker correction.
3	C1 (O)	Reset output to fluorescent display tube drive IC. Drum correction.
4	C2 (O)	Data transmission clock output to fluorescent display tube drive IC. Function key output.
5	C3 (O)	Decimal point output to fluorescent display tube drive IC. Function key output.
6	Blank sensor (I)	Record blank (between selection) position data input. (active: L)
7	RES (I)	Reset input.
8 – 11	D0 – D3 (O)	Function key output. (active: L) Data output to fluorescent display drive IC.
12	S/S (O)	Function key display LED output. (active: L)
13	33 (O)	
14	45 (O)	
15	REPEAT (O)	Function key display LED output. (active: L)
16	MUTE (O)	
17	CLOSE (O)	
18	OPEN (O)	Function key display LED output. (active: L)
19	—	
20	TEST (I)	
21	VSS	Power supply ground pin.
22	◀ (O)	Tonearm drive high speed FWD output. (active: H)
23	▶ (O)	Tonearm drive high speed BACK output. (active: H)
24	◀ (O)	Tonearm drive low speed FWD output. Outputs for 400 mS after ARM TRANSPORT key (▲) is pushed. (active: H)
25	▶ (O)	Tonearm drive low speed BACK output. Outputs for 400 mS after ARM TRANSPORT key (▾) is pushed. (active: H)
26	PM Kick (O)	Arm UP/DOWN solenoid kick signal output. Outputs for 800 mS after ARM LIFTER (▾ / ▾) key is pushed. (active: H)
27	PM Hold (O)	Arm UP/DOWN solenoid hold signal output. (active: H)

Pin No.	Pin Name	Function
28	PAUSE (O)	Synchro PAUSE signal output. Outputs for 200 mS after arm completes down operation. (active: H)
29	REC MUTE (O)	Synchro REC MUTE signal output. Outputs for 200 mS before arm performs up operation. (active: H)
30	ARM INH (I)	Arm offset angle correction prohibition. (active: L)
31	_____	Not used on this model.
32	TT (O)	Turntable drive signal output. (active: H)
33	Arm position (I)	Input to detect tonearm position.
34	Record position (I)	Address pulse signal input of record blank position data.
35	END sensor (I)	Record END position data input.
36	_____	Not used on this model.
37	B0 (I)	Function key matrix input. (active: L)
38	B1 (I)	
39	B2 (I)	
40	B3 (I)	
41	VDD (I)	5 V power supply.
42	EXTAL (I)	Clock oscillation pin.

KEY MATRIX

Pin No. (O)	② C0	③ C1	④ C2	⑤ C3	⑧ D0	⑨ D1	⑩ D2	⑪ D3
⑦ B0	marker correction	drum correction	OPEN SW	SPEED KEY	1 KEY	5 KEY	9 KEY	OPEN/CLOSE KEY
⑧ B1			CLOSE SW	REPEAT KEY	2 KEY	6 KEY	CLEAR KEY	▼/▼ ARM LIFTER KEY
⑨ B2		_____	ARM REST SW	▷ (FWD) KEY	3 KEY	7 KEY	SKIP KEY	REMOTE CONTROL START
⑩ B3		_____	DOWN SW	◁ (BACK) KEY	4 KEY	8 KEY	START/STOP KEY	REMOTE CONTROL STOP

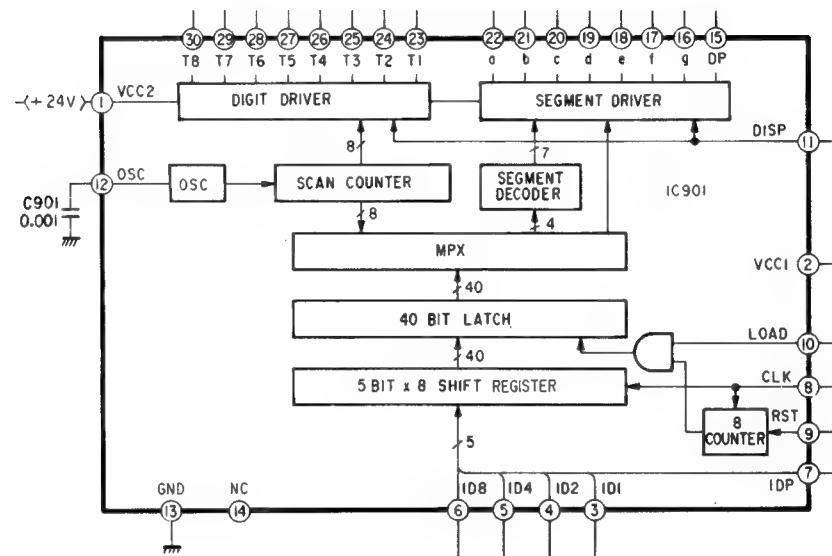
Note: Marker correction, drum correction, Down SW: active high
others: active low

8 DIGIT INDICATOR TUBE DRIVER (M54940P)

M54940P is a fluorescent indicator tube decode driver which memorizes the 5 bit x 8 digit data from the system control microcomputer (IC102) and performs (7 segment + decimal point) x 8 digit display by the dynamic lighting method.

One digit worth of data consists of BCD 4 bits and decimal point 1 bit (always high on this model).

The data memory is carried out by the shift register latch form, and previous data can be indicated during data forwarding.

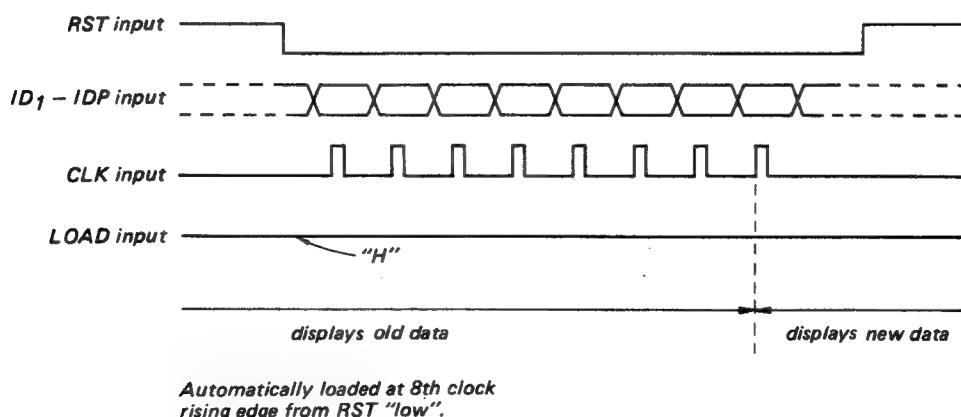


M54940P Block Diagram

1) Pin Function Description

Pin No.	Pin Name	Function
1	Vcc2	Power supply for indicator tube output.
2	Vcc1	Power supply for logic circuit.
3 - 6	ID ₁₋₈	BCD data input pins.
7	IDP	Decimal point data input pin.
8	CLK	Data forwarding clock input pin. Data is read in at clock rising edge.
9	RST	Reset input pin. At high, resets CLK input pulse counter.
10	LOAD	Input pin for signal which loads shift register data to data latch.
11	DISP	Indicates at high, no indication at low. During no indication, segment and digit outputs are low. The display can be erased by making this low.
12	OSC	Oscillation pin.
13	GND	Ground.
14	NC	Do not connect.
15	DP	Decimal point output pin.
16 - 22	a - g	Segment output pin.
23 - 30	T ₁₋₈	Digit output.

2) Data Read-in Timing



Data Read-in Timing

3) Input Data and Indication

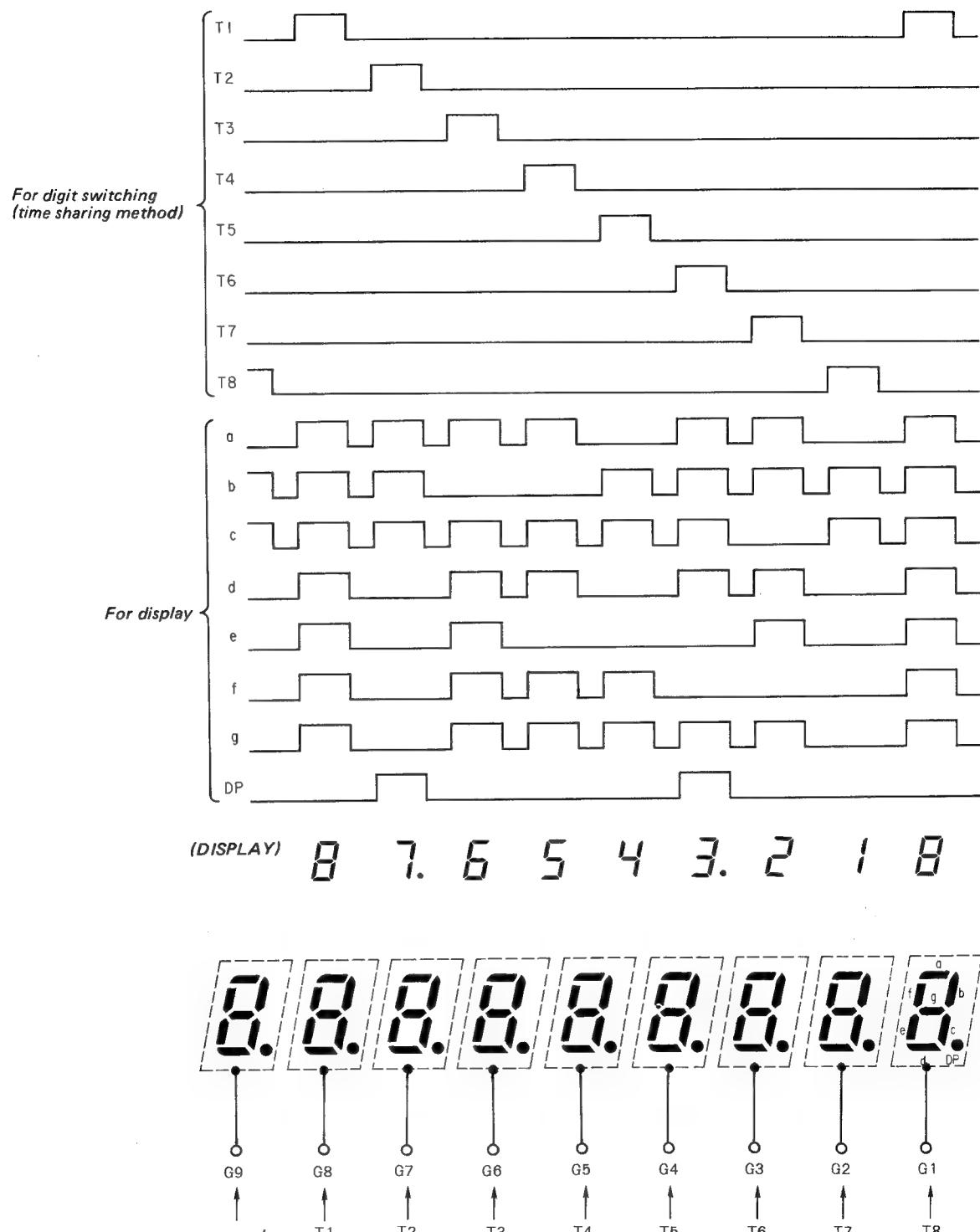
	BCD Data Input				Display
	ID 8	ID 4	ID 2	ID 1	
0	L	L	L	L	0
1	L	L	L	H	1
2	L	L	H	L	2
3	L	L	H	H	3
4	L	H	L	L	4
5	L	H	L	H	5
6	L	H	H	L	6
7	L	H	H	H	7
8	H	L	L	L	8
9	H	L	L	H	9
A	H	L	H	L	A
B	H	L	H	H	B
C	H	H	L	L	C
D	H	H	L	H	D
E	H	H	H	L	E
F	H	H	H	H	F

Decimal point output is output when a digit's decimal point bit is high, independent of BCD data.

Also, if several decimal point bits are made high, multiple decimal points will be displayed.

Relationship between Input Data and Indication

4) Data Output and Indication



Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Connec-tion	F \ominus	G9	g	G8	f	G7	e	G6	d	G5	NP	G4	DP	G3	c	G2	b	G1	a	F \oplus

Indicator tube grid is controlled by time sharing method.

Relationship Between Data Output and Indication

BLANK DETECTION CIRCUIT

When turntable loading close operation is performed, this set checks record information (record loaded or not, size (30 cm, 25 cm, 17 cm), number of selections) optically.

For blank (between selection) detection, there are two types of data relative to system control microcomputer IC301: horizontal position data (address) and data which identifies blanks.

Horizontal position data is obtained by converting the light intensity from the slit plate directly connected to the loading motor to an electrical signal by photo Tr (Q401), and counting this pulse inside the system control microcomputer. Blank data is obtained by converting the intensity of the reflected light at sound grooves and non-sound grooves into electrical signals by photosensor (Q405) and identifying blanks inside the system control microcomputer.

The system control microcomputer gets the number of pulse changes from the marker position from these two data and judges record mounted or not, size (30, 25, 17 cm) and blank, record end, etc. positions. The difference between blanks and record end is identified inside the system control microcomputer by the length of time that the blank signal is low.

The circuit operation is shown in Figure 3.

- Reference voltage waveforms during turntable loading close operation.

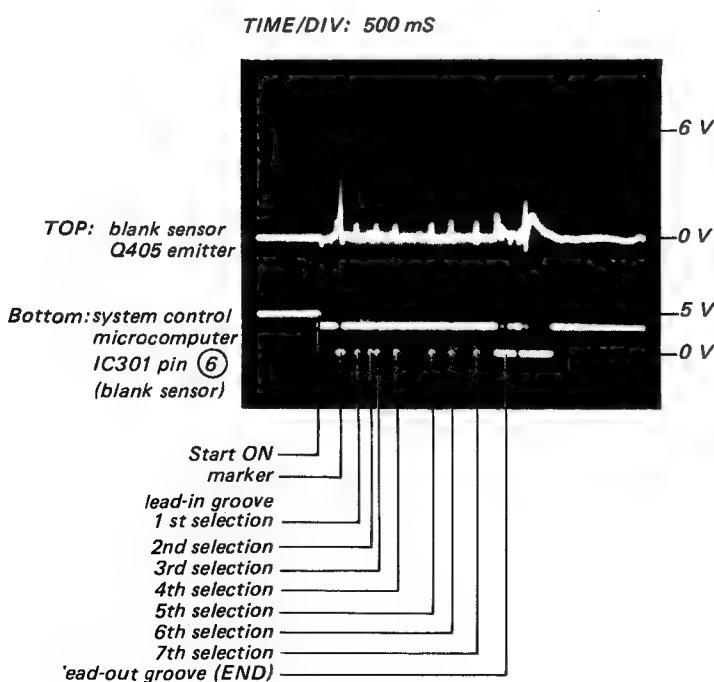


Figure 1

Q703-705, IC703 (1/2) CIRCUIT

When the blank sensor (Q405) finds the marker, voltage with a widening at the bottom of more than 5 V is output. At this time, if comparator (IC303) reference voltage is low, the marker position looks fast as seen from the system control microcomputer (IC301). Because of this, Q705 is turned on during marker detection to raise reference voltage to 2.5 V. See Figure 3 for circuit operation.

(IC302 pin ② input voltage waveform)

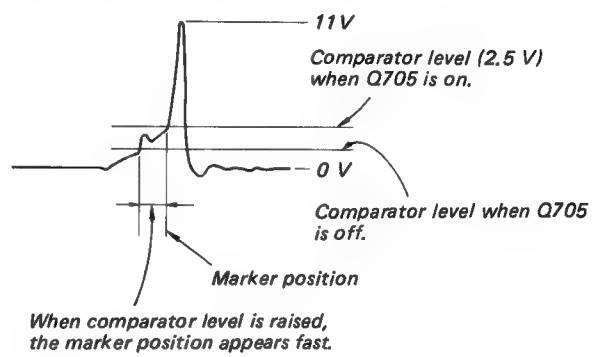
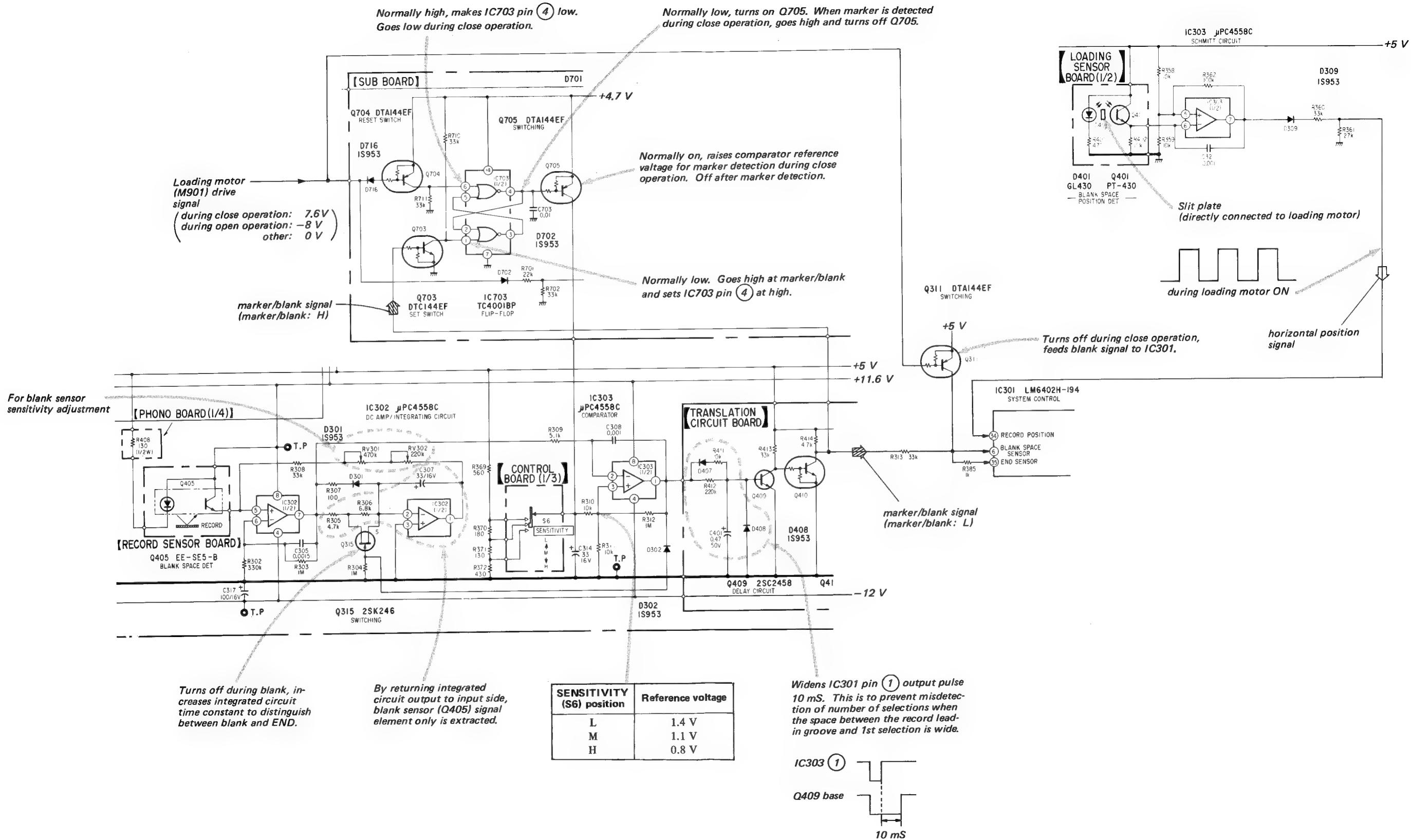


Figure 2



RECORD WARP SERVO CIRCUIT

This circuit is so that the stylus will always be lowered at the place where blank was detected during turntable loading close operation for auto play.

If there is record hole play, or warp, even if the stylus is lowered at the location detected as blank by the system control microcomputer (IC301), the position may be wrong.

In order to get rid of this difference, this circuit causes the arm UP/DOWN solenoid (PM401) kick signal to be generated so that the stylus descends at the blank detected location.

The method of kick signal generation is as follows.

The turntable motor 8-pole magnet is used, and it is detected by the hole sensor (H401), DC amplification and wave shaping are performed at IC401, and this signal is input as an octal counter clock. Then,

by resetting the octal counter at the completion of turntable loading close, the 8 outputs of this octal counter have memorized 8 set locations when the turntable was rotating. (Counter "0" is where blank was detected.)

Even if the kick signal for lowering the stylus on the blank detected location on a rotating record is generated when the detected location is under the stylus, the location will move during the time that the stylus is descending. So, it is generated at the location which is the blank detected location minus the amount of movement.

The speed of descent varies with the arm, so by switching the octal counter output, kick signal generation timing can be changed and adjusted.

Refer to waveforms ① – ⑧ below and Figure 4 for circuit operation.

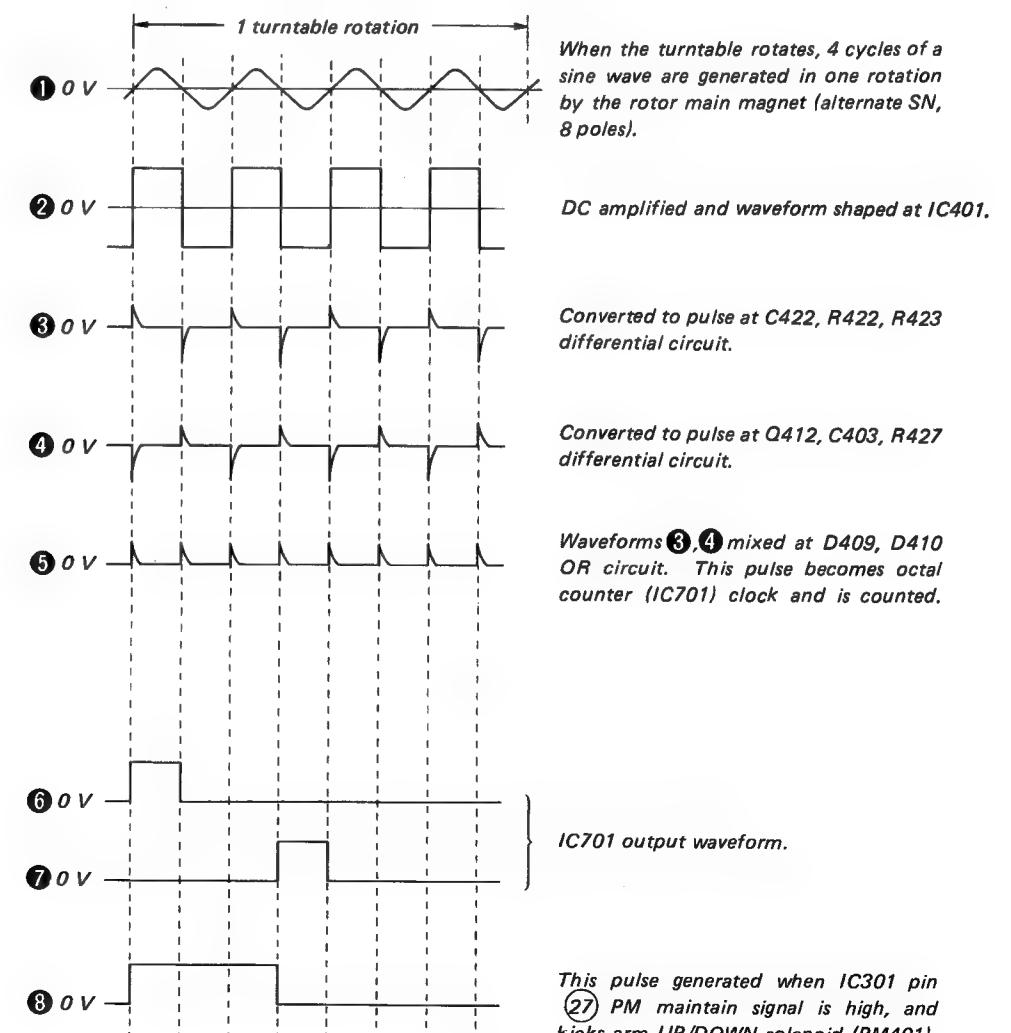
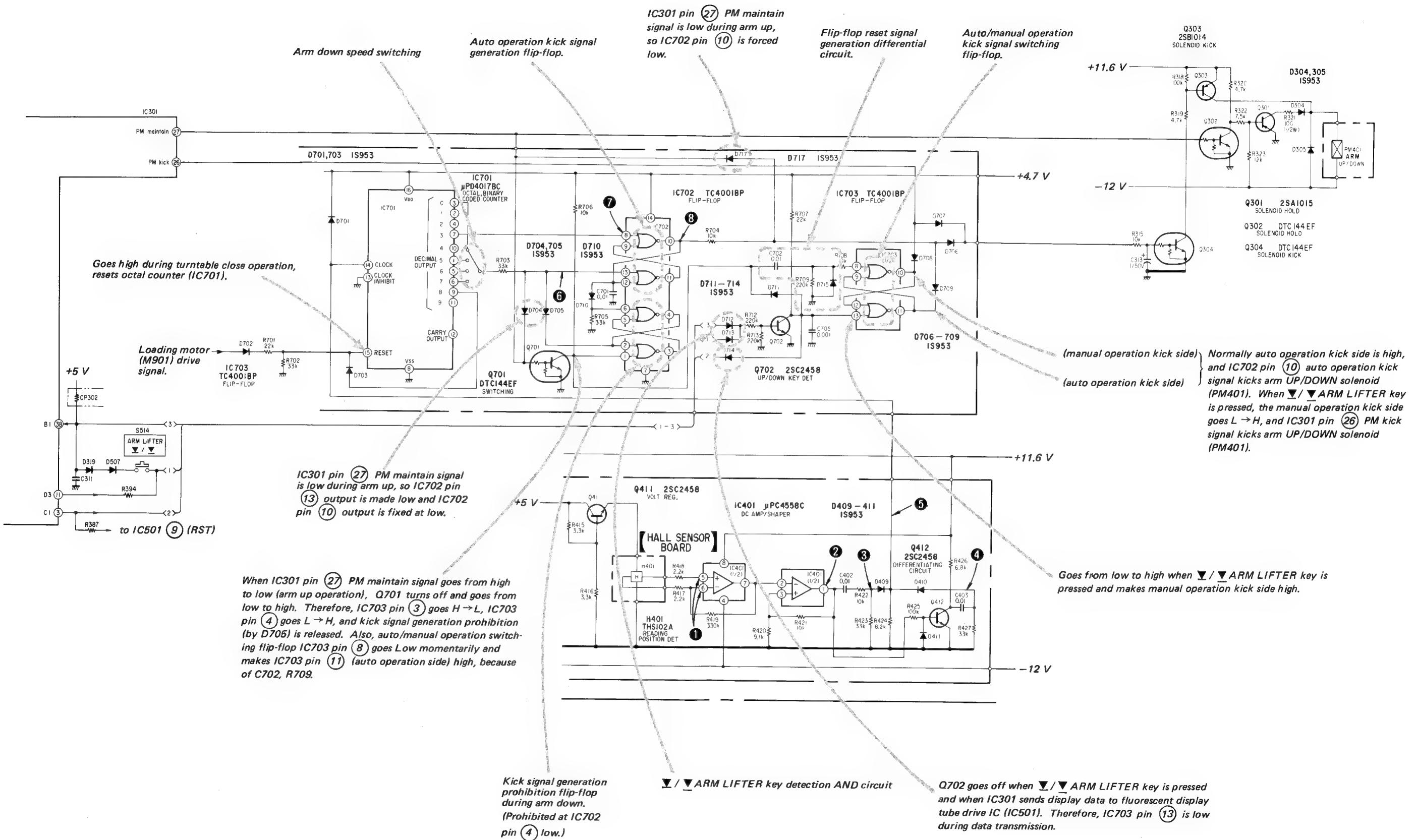


Figure 4



TIMING CHART

Indicates timing from turntable open state when START key is turned on and close switch (S4) turns on.

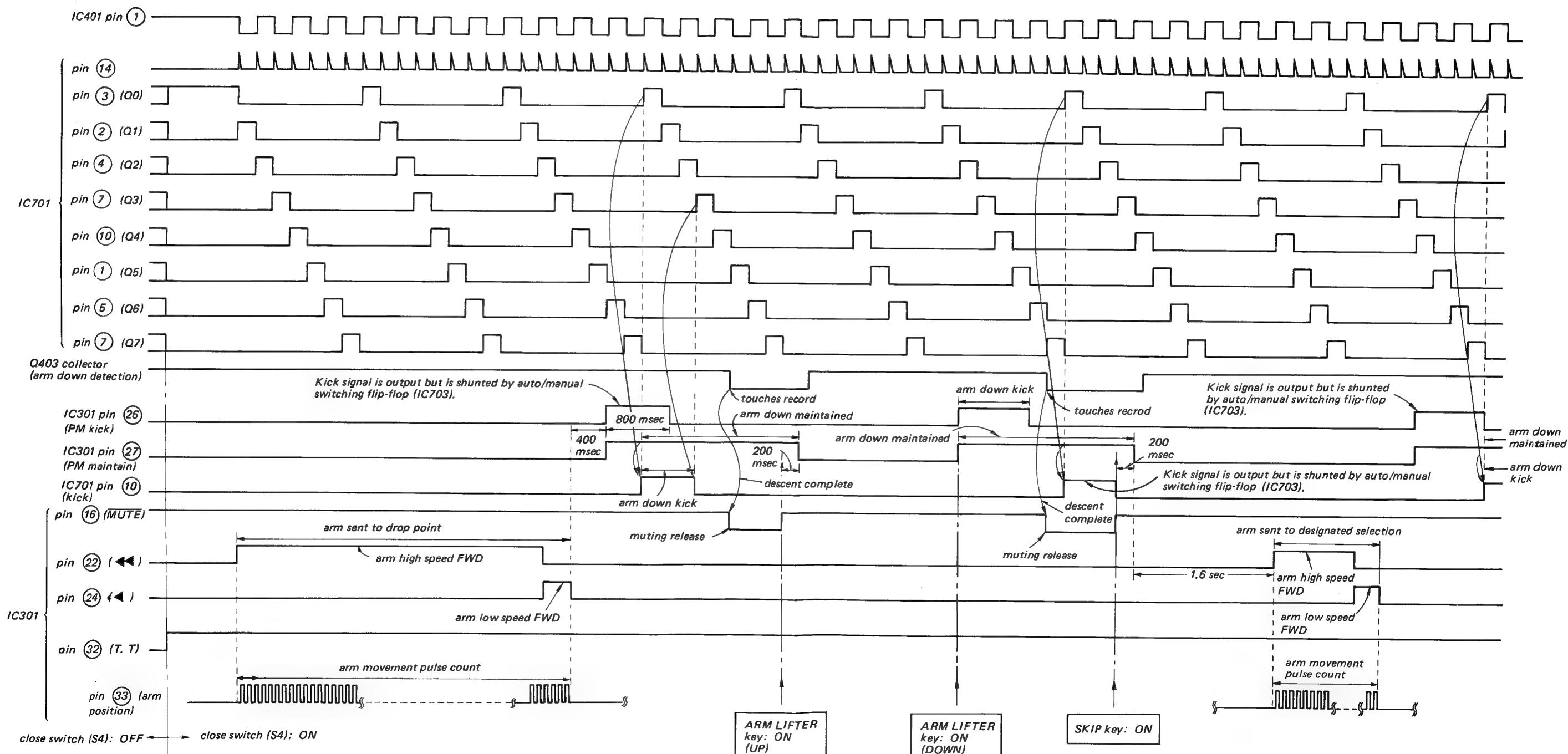
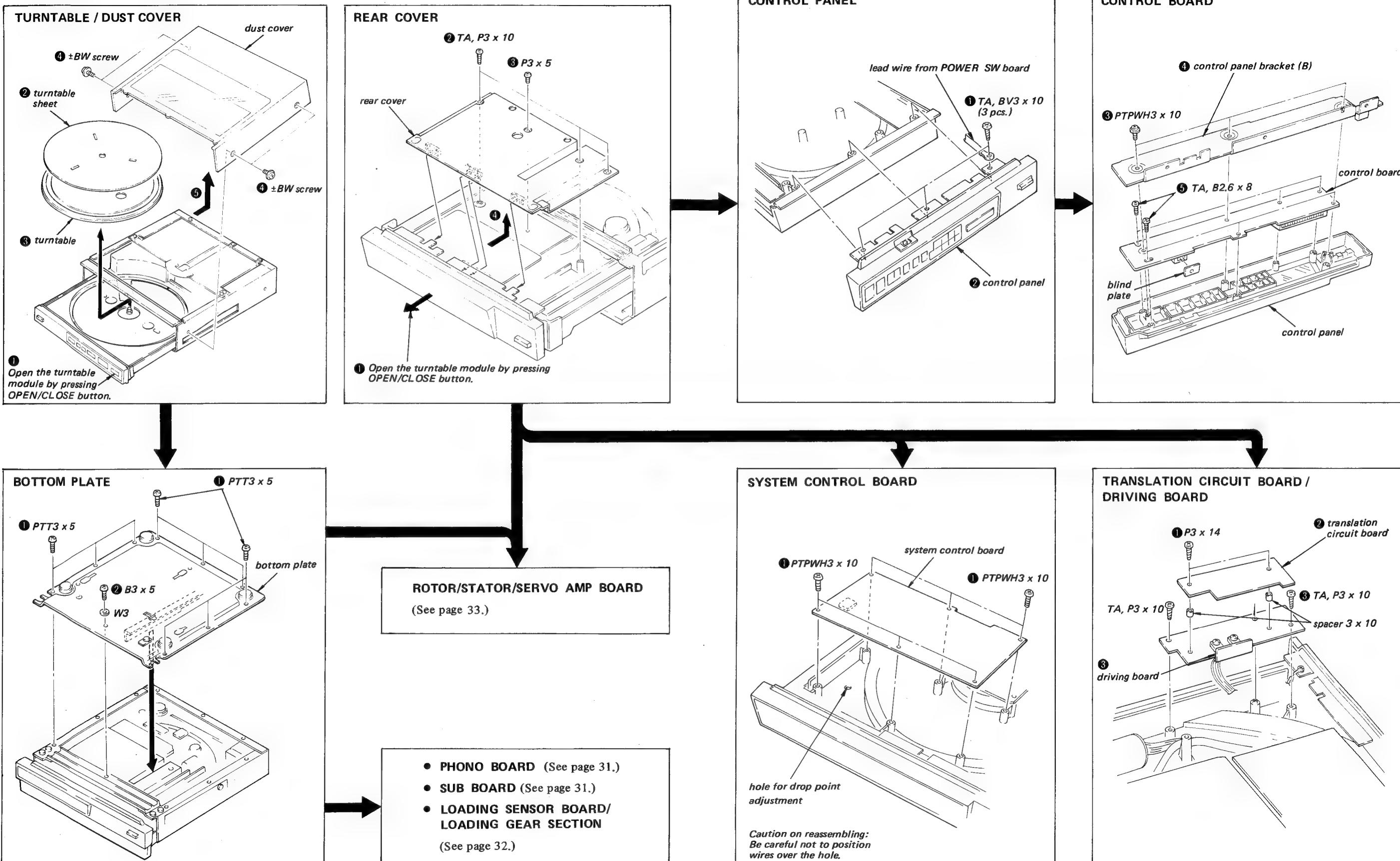


Figure 6

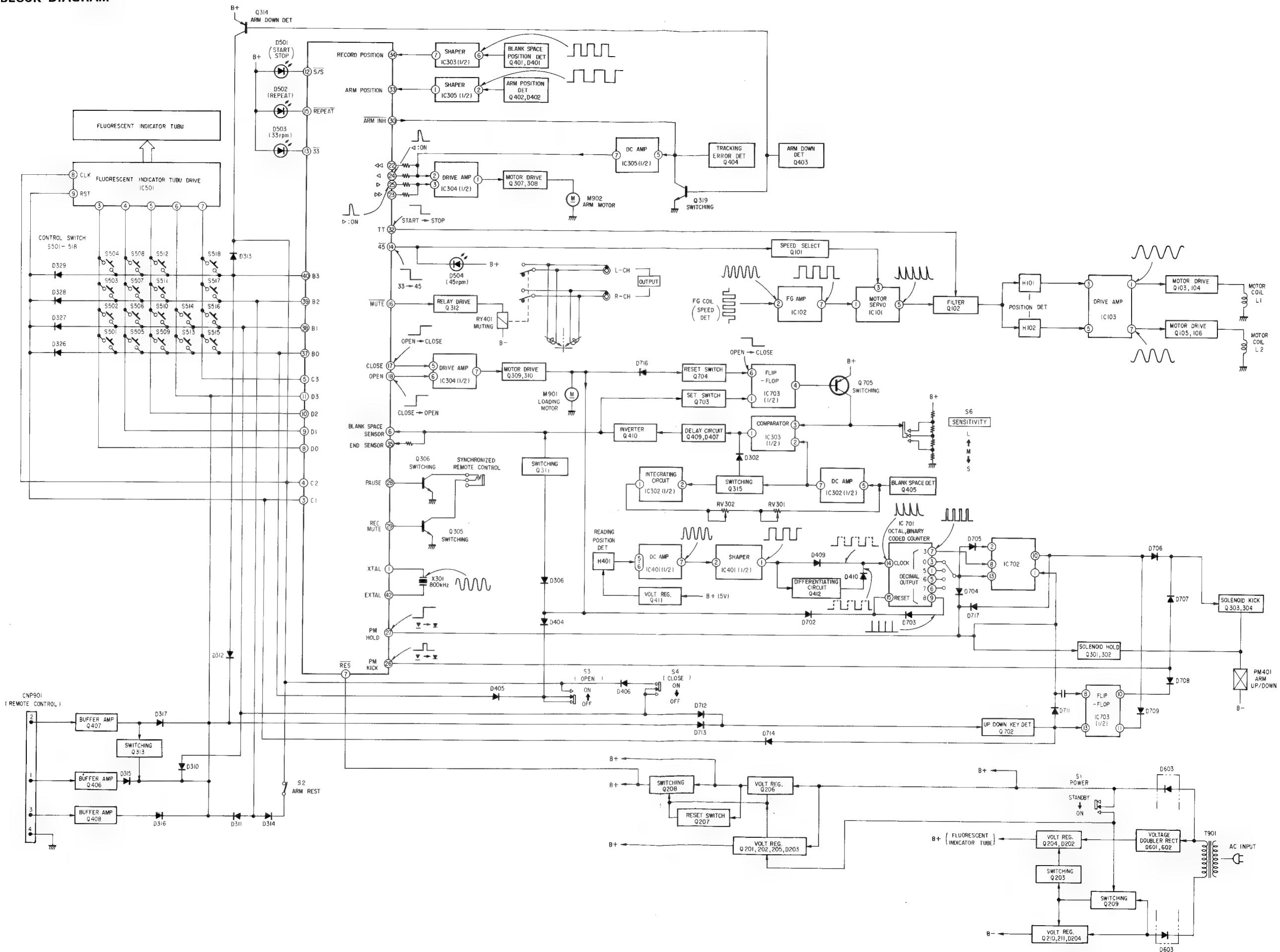
SECTION 2

DISASSEMBLY

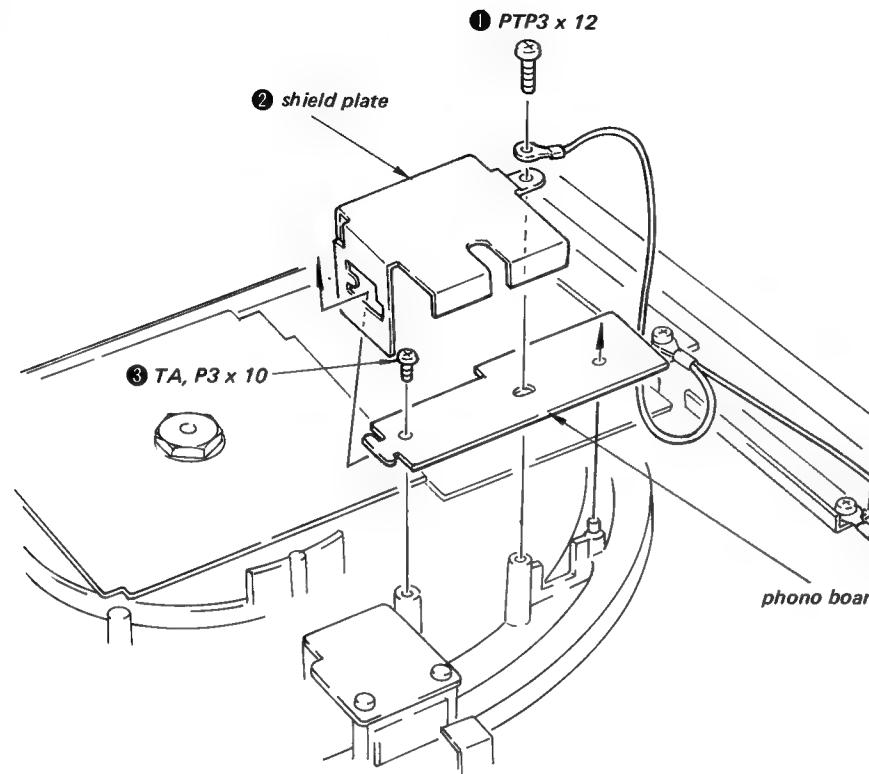
2-1. REMOVAL



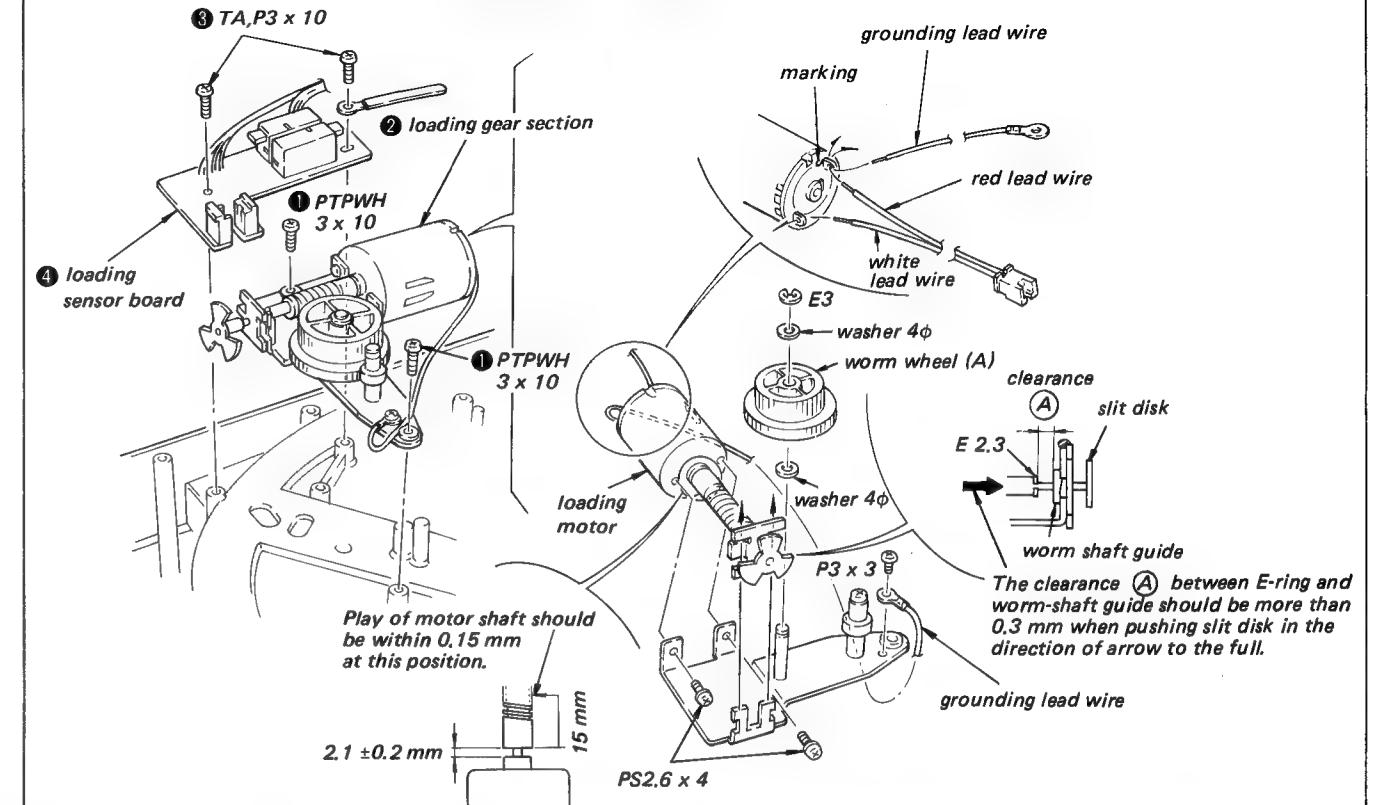
1-2. BLOCK DIAGRAM



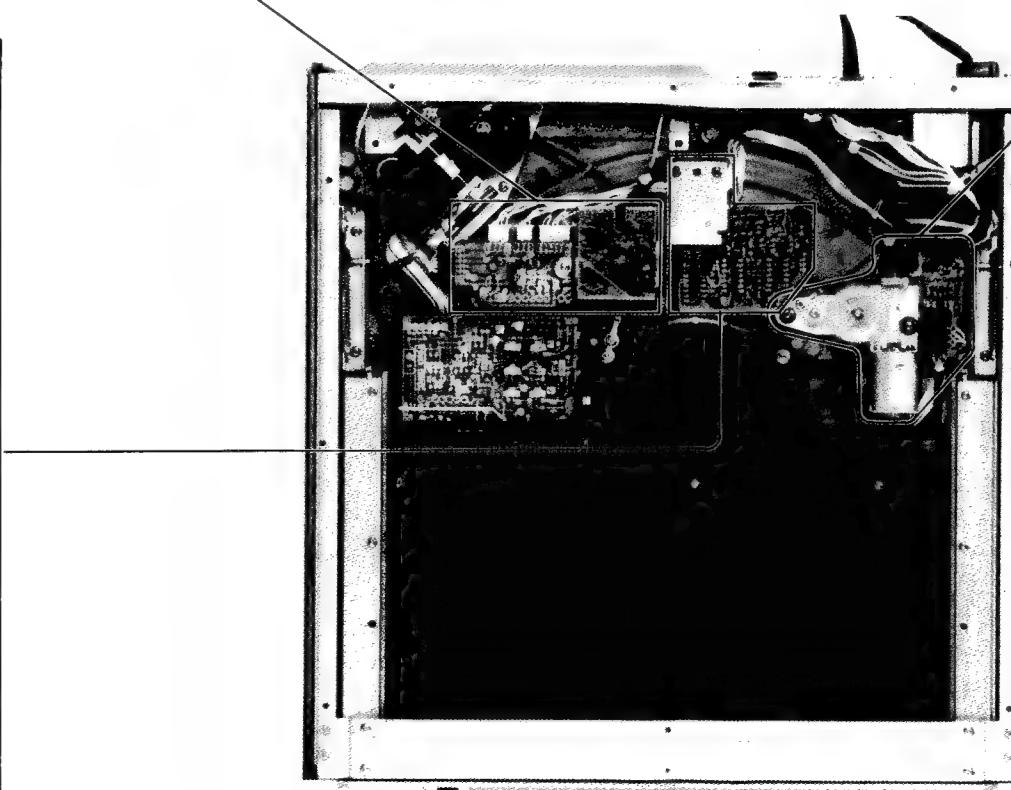
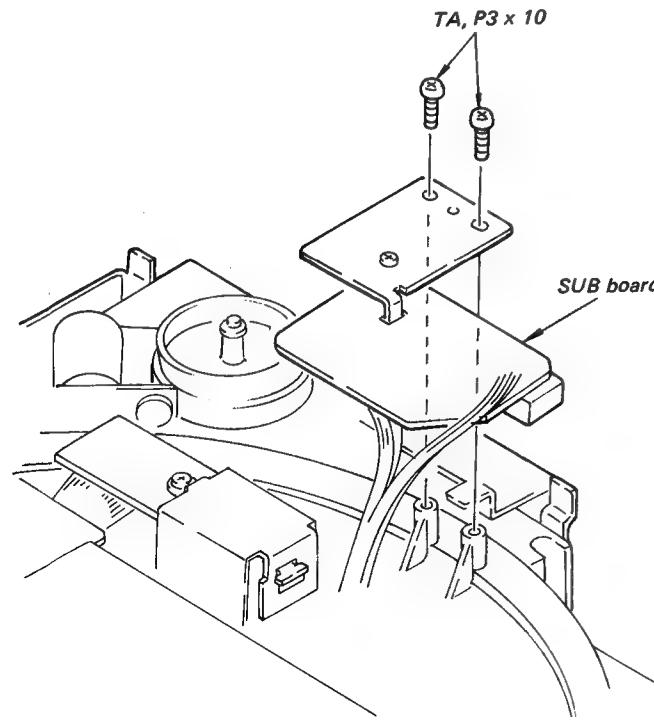
PHONO BOARD



LOADING SENSOR BOARD / LOADING GEAR SECTION



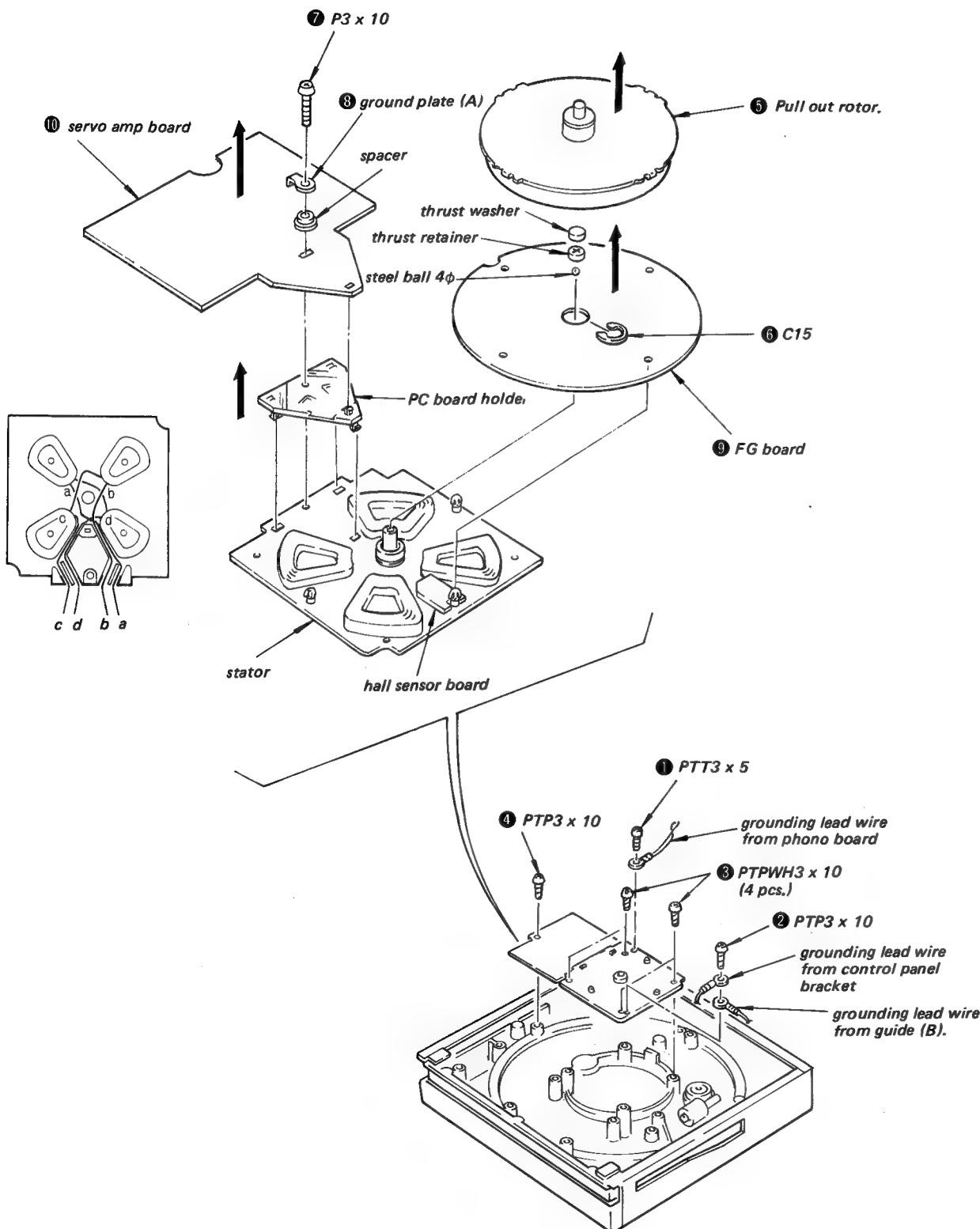
SUB BOARD



— With bottom plate removed. —

— With rear cover removed. —

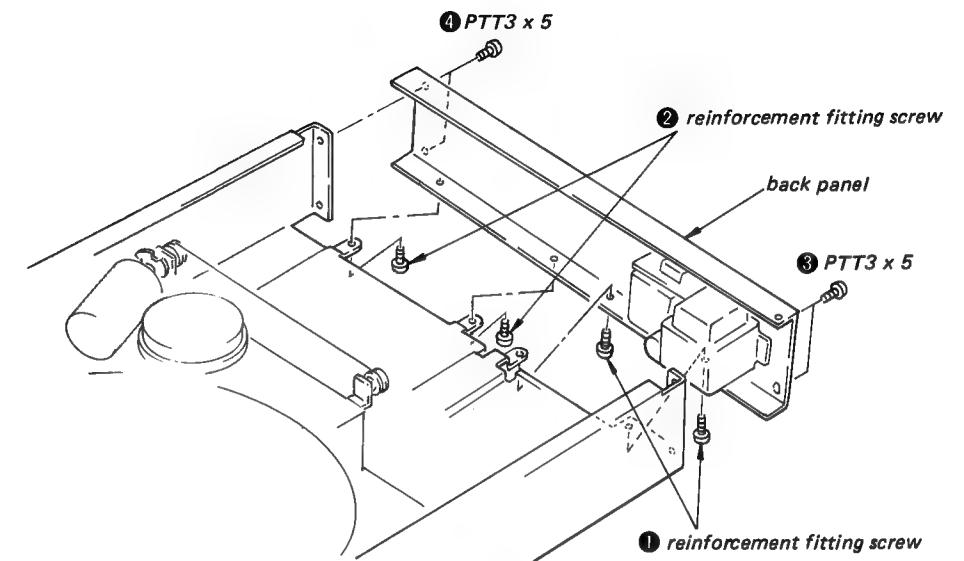
ROTOR / STATOR / SERVO AMP BOARD



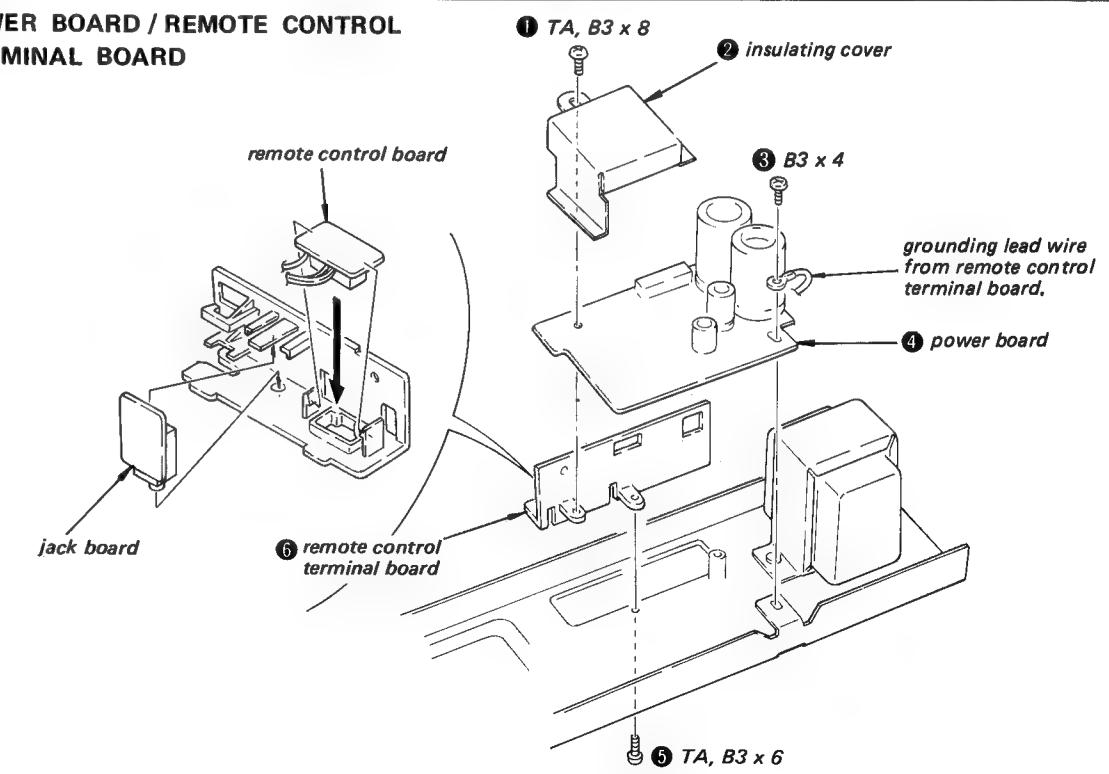
Remove bottom plate.

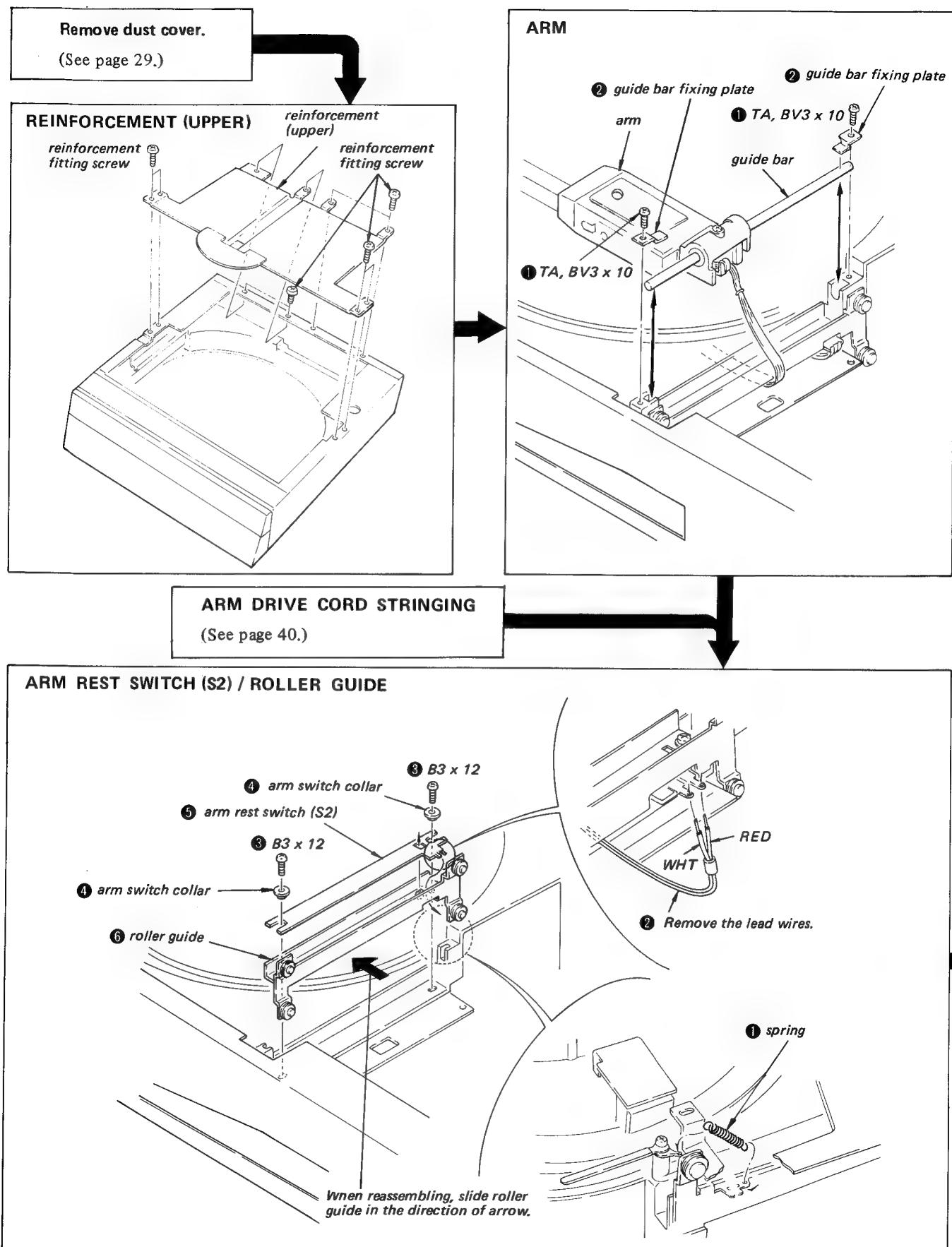
(See page 29.)

BACK PANEL

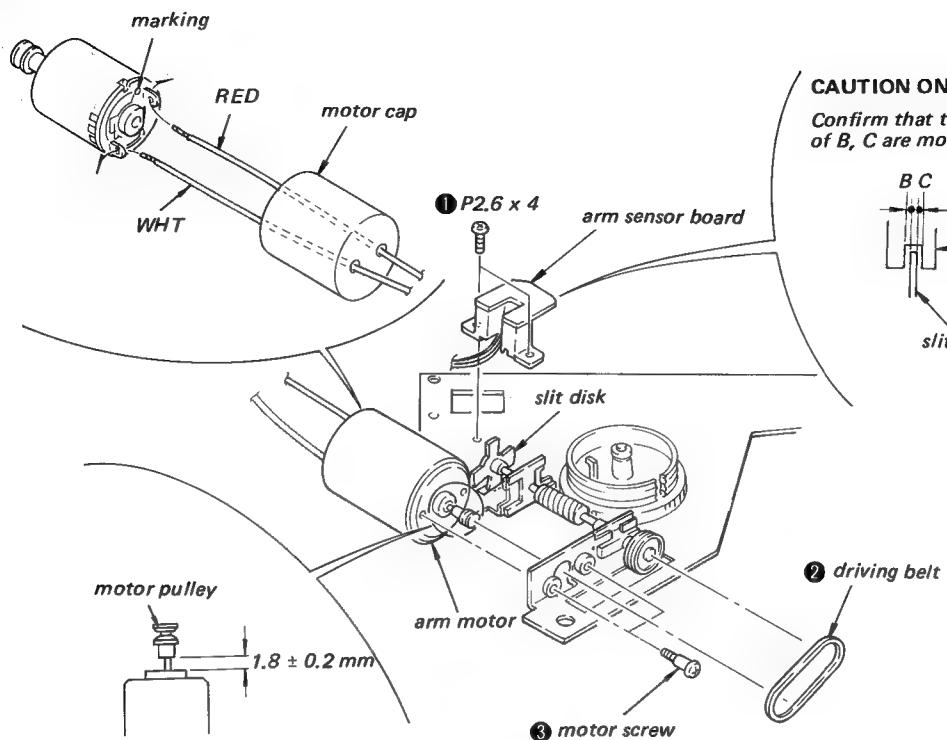


POWER BOARD / REMOTE CONTROL TERMINAL BOARD

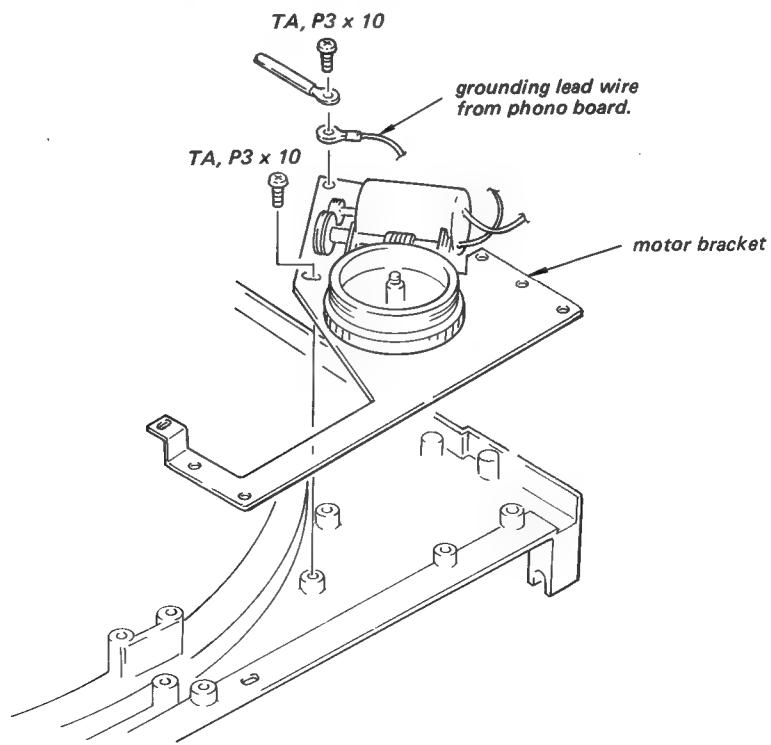




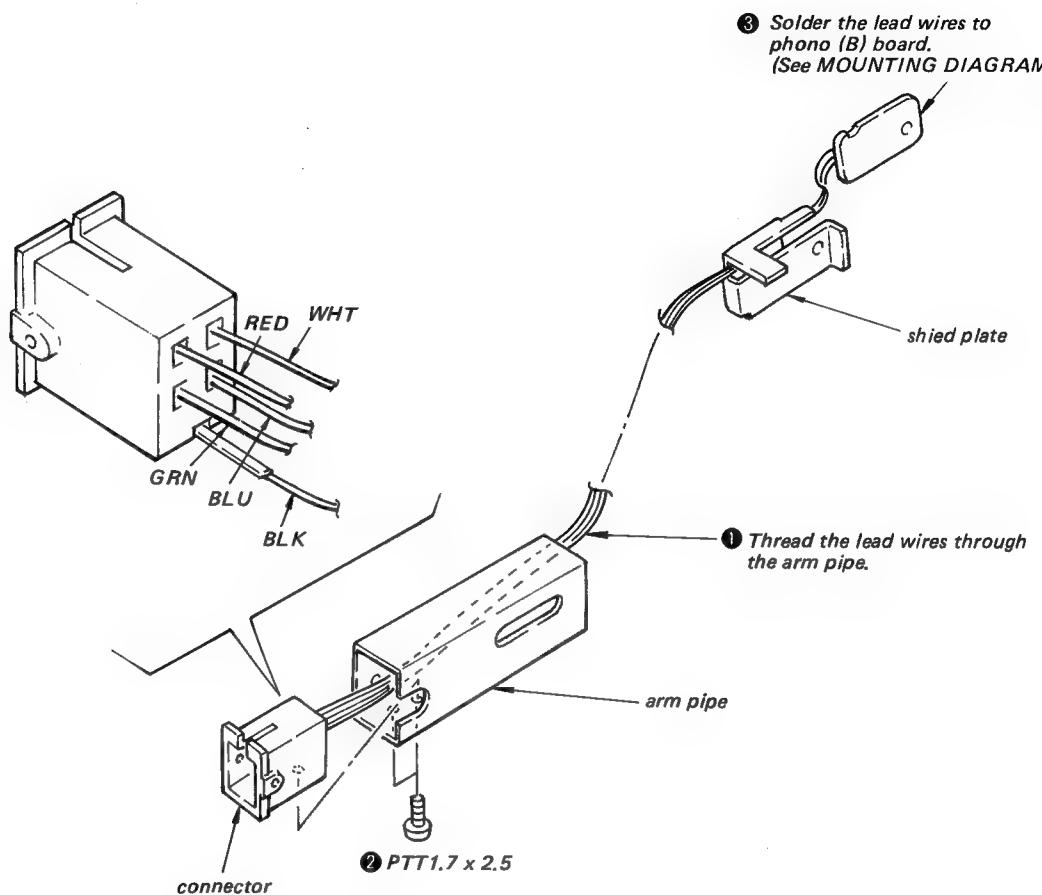
ARM MOTOR



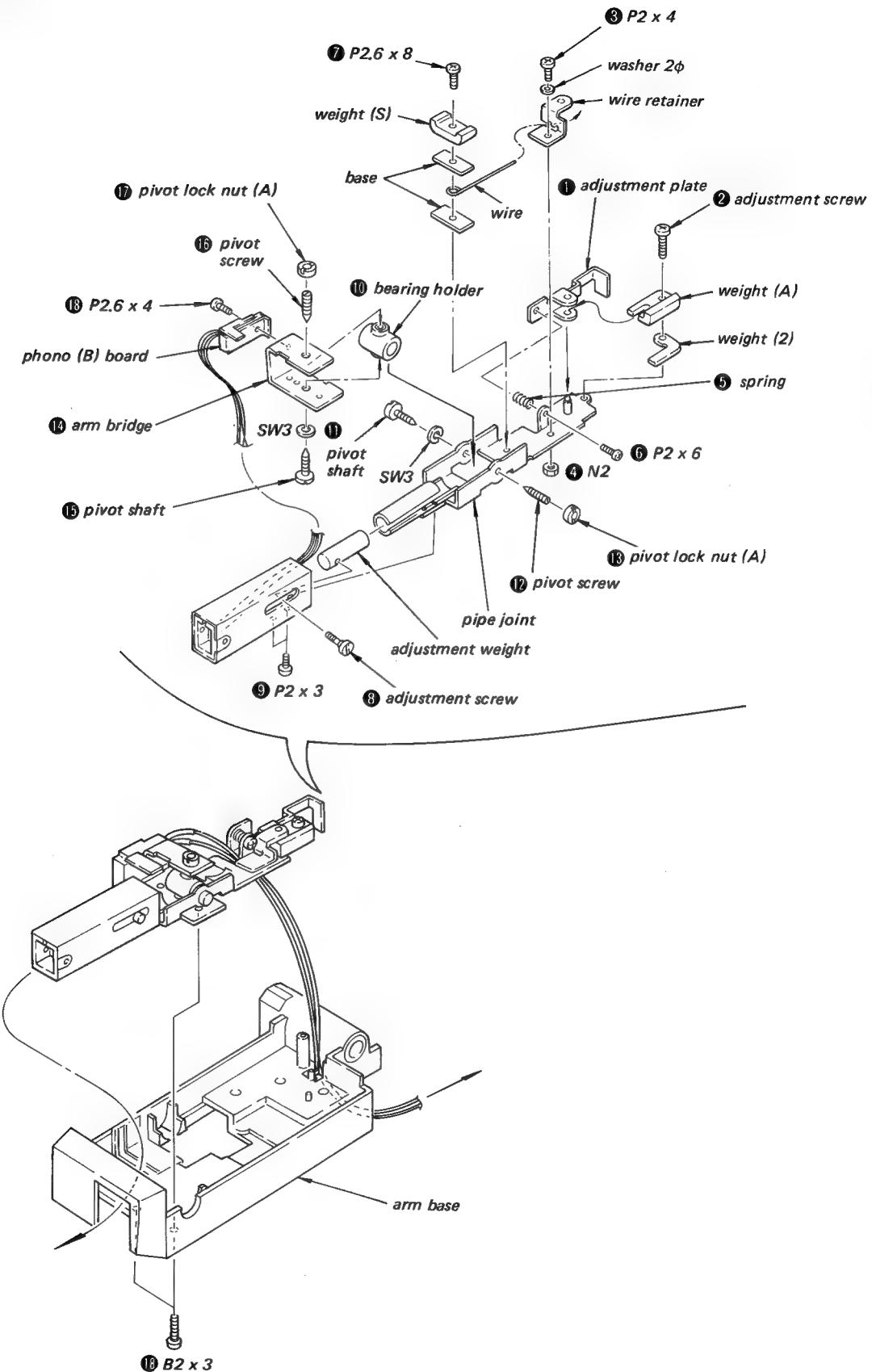
ARM MOTOR BRACKET



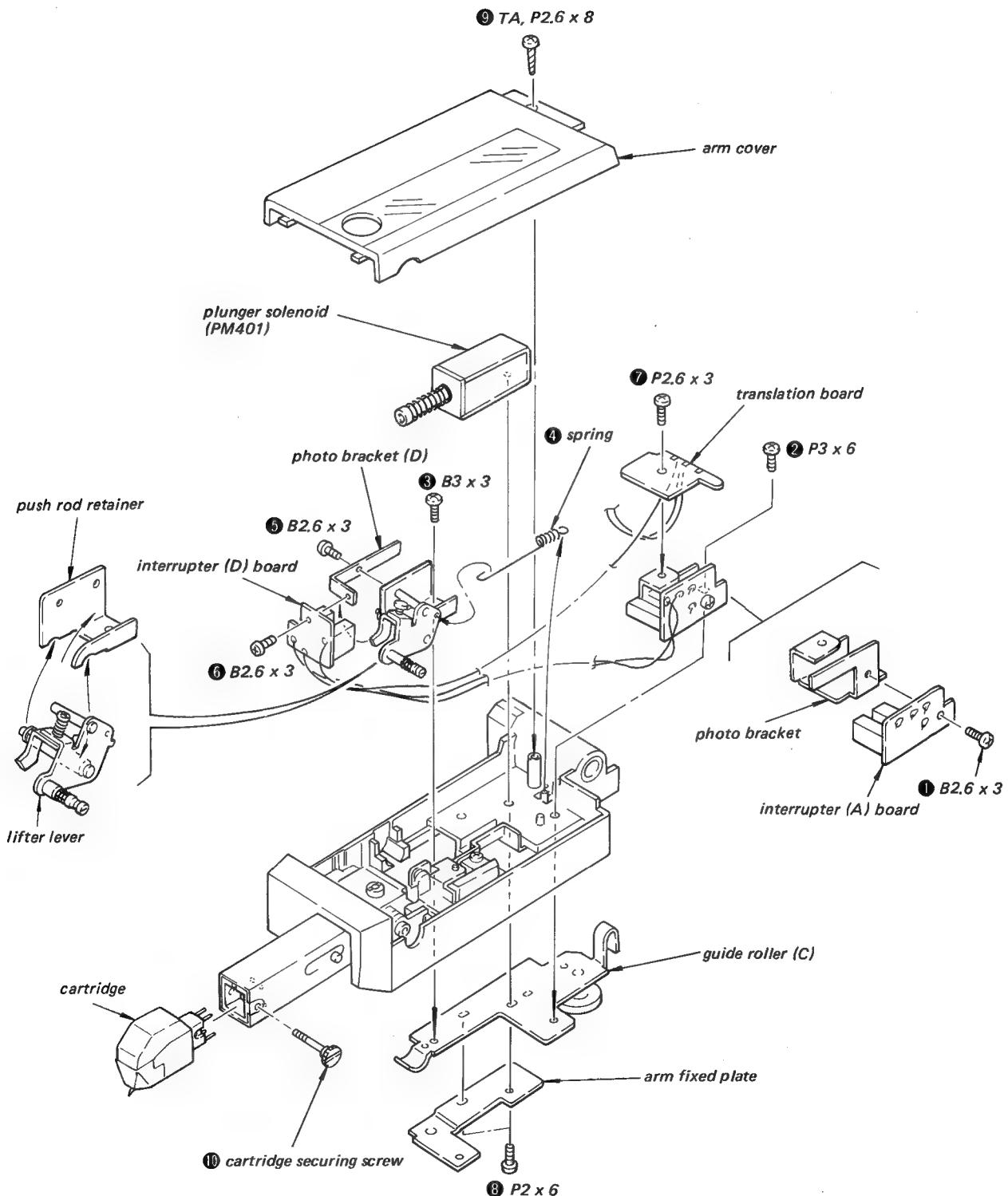
ARM ASSEMBLING (1)



ARM ASSEMBLING (2)

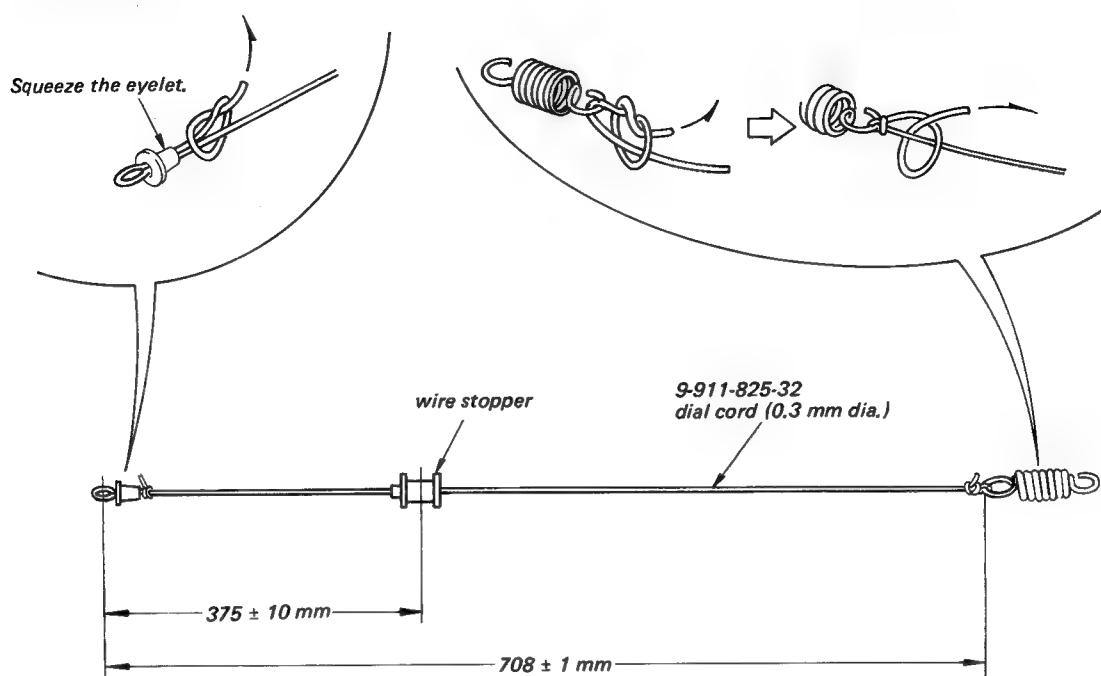


ARM ASSEMBLING (3)

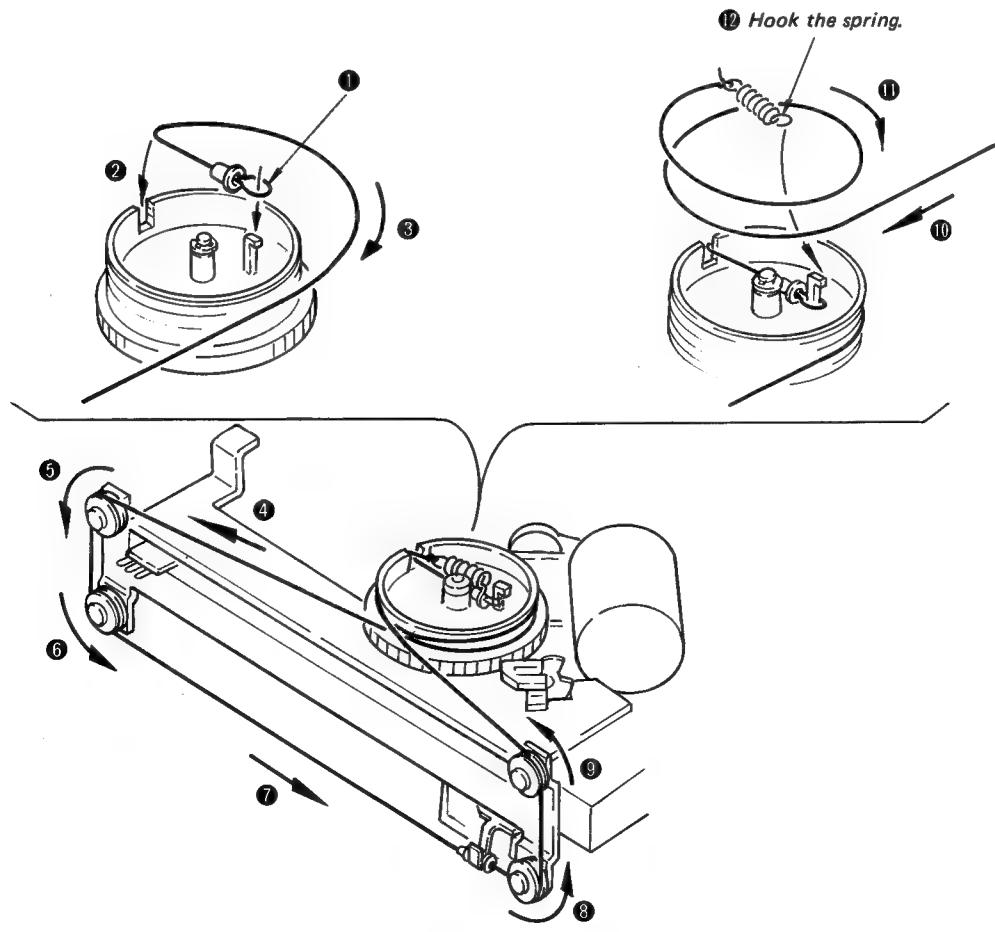


2-2. ARM DRIVE CORD STRINGING

(1) Preparation



(2) Stringing



SECTION 3

ADJUSTMENTS

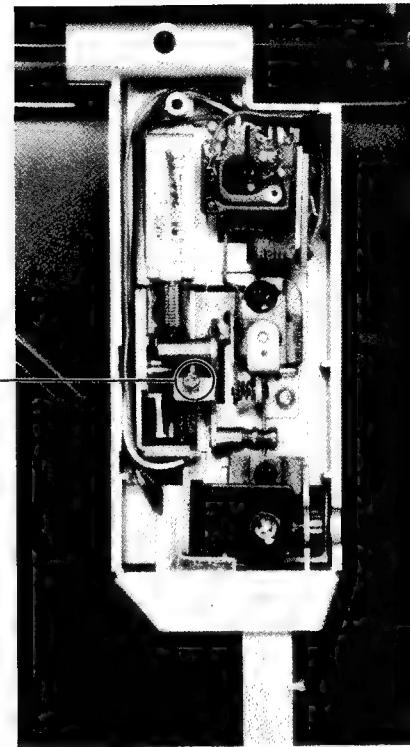
3-1. MECHANICAL ADJUSTMENTS

Note: The adjustment should be performed in the order given in this service manual.
After the adjustments, apply suitable locking compound to the adjustment screws.

Muting Position Adjustment

1. Put a record.
2. Attach the cartridge and set the stylus force adjustment knob to the center.
3. Press ARM TRANSPORT button (\triangleleft) and move the arm over the turntable.
4. Press ARM LIFTER button (∇/∇) and adjust with the shutter adjustment screw so that sound comes out 0.5 – 1 seconds after a stylus tip drops on the record.

shutter adjustment screw



Arm Pipe Angle Check

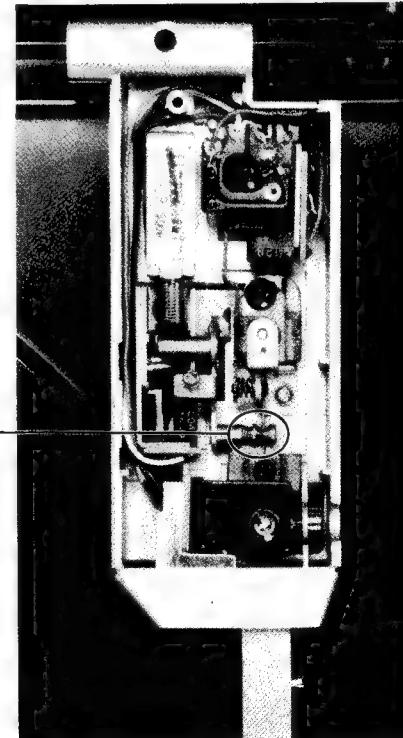
1. Position the slit of arm rest switch (S2) position adjustment screw to the center. (See page 44.)
2. Put the test record (YFSC-16).
3. Press START/STOP button.
4. Adjust with the horizontal position adjustment screw so that the drop point at this time is within the specification.

Specification: 9 – 12 counts

Turning to the right: Count decreases.

Turning to the left: Count increases.

arm pipe horizontal position adjustment screw

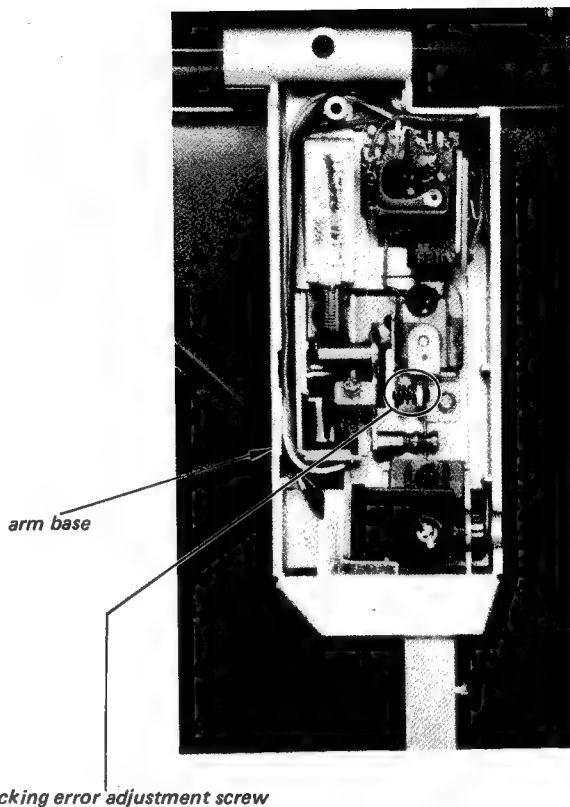


Tracking Error Adjustment

1. Place a test record (YFSC-16) on the turntable and press START/STOP button for lead-in.
2. Just after the first count appears since the arm went DOWN, cause the arm to go UP and then go DOWN again. Note the counts at these two points, and then confirm that the difference in count is within 3 counts.
If necessary, adjust with tracking error adjustment screw.
3. After completing step (2), cause the arm to go DOWN, and then go UP just after the arm base moves.
4. Check the count at that time, and then confirm that the difference in count when the arm goes DOWN again is within 2 counts.
5. After installing the arm cover to arm base, confirm tracking error adjustment. If necessary, perform step (1) - (5).

— Adjustment Direction —

For (2) when arm base moves, turn to the right.
For (4) when the difference in count is too large, turn to the left.

*tracking error adjustment screw*

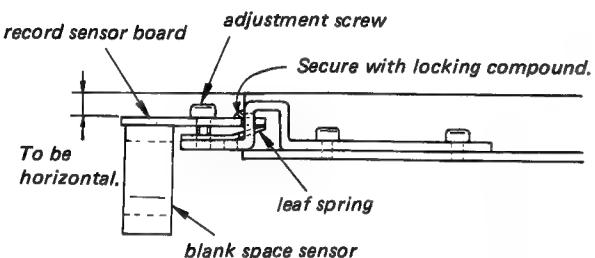
Blank Space Sensor Adjustment

This adjustment should be performed only when the followings have been done.

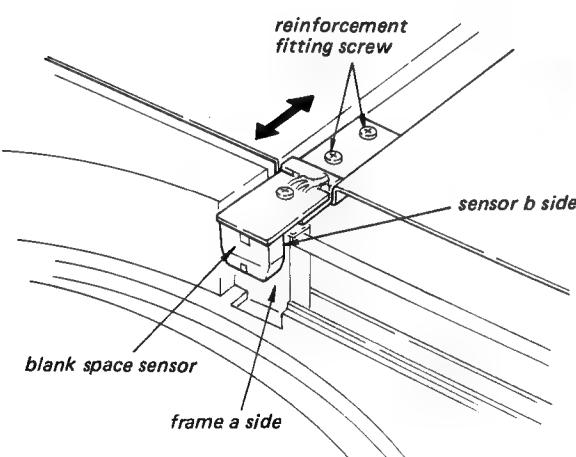
- When assembling blank space sensor section:
- When replacing photo coupler of blank space sensor:

1. Blank Space Sensor Inclination Adjustment

- 1) Press OPEN/CLOSE button and open the turntable module.
- 2) Adjust with the adjustment screw so that record sensor board is horizontal.

**2. Blank Space Sensor Position Adjustment**

- 1) Press OPEN/CLOSE button and open the turntable module.
- 2) Move the blank space sensor in the direction of arrow so that the clearance between frame a-side and rear side of blank space sensor (b-side) is 0.5 – 1 mm and tighten the reinforcement fitting screws.

**3. Blank Space Sensor Voltage Adjustment****Setting:**

SENSITIVITY switch: H

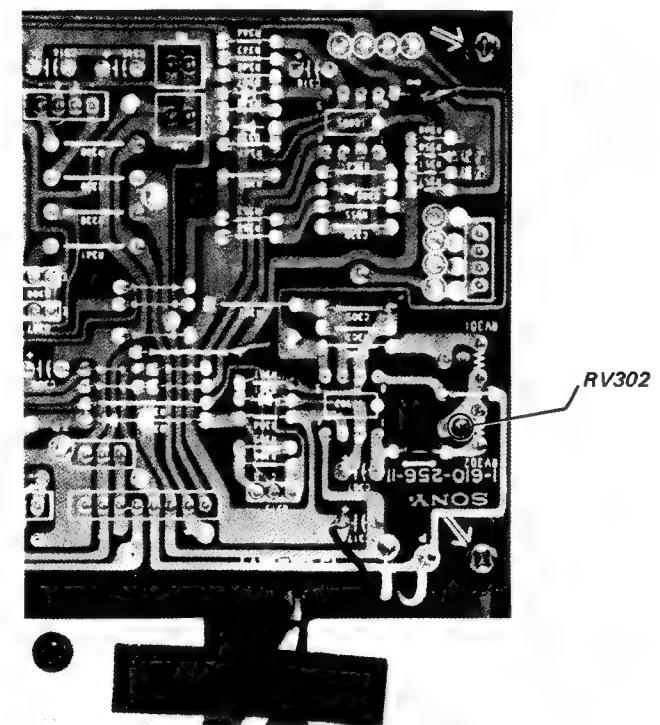
- 1) Put the test record (YFSC-16).
- 2) Press OPEN/CLOSE button and close the turntable module.
- 3) Adjust RV302 so that the indication on the display at this time is within the specification.

Note: This adjustment should be performed for both A side and B side of the test record (YESC-16).

Specifications:

A side: 6 – 7
B side: 13 – 14

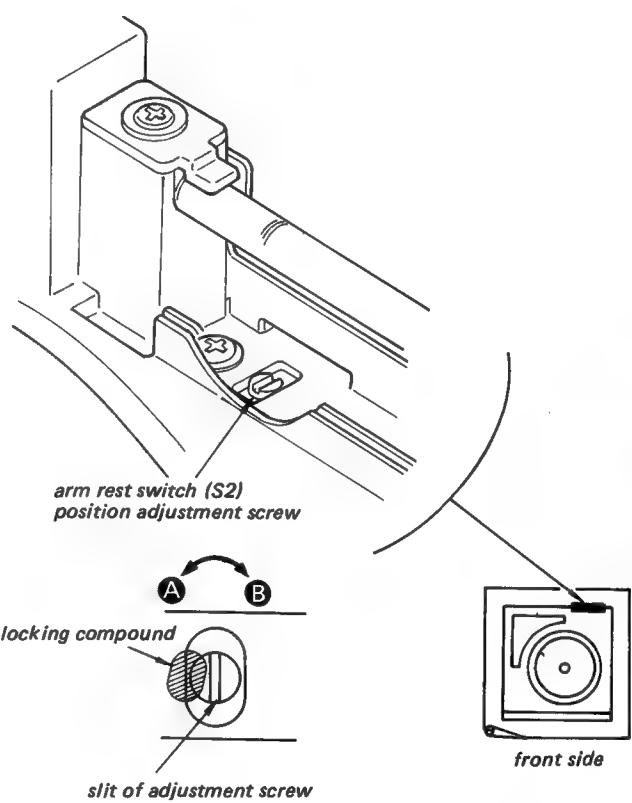
— system control board (conductor side) —

**Drop Point Adjustment**

1. Put the test record (YFSC-16).
2. Press START/STOP button.
3. Adjust with the adjustment screw so that the drop point at this time is within the specification.

Test Record	Specification
YFSC-16 (30 cm)	6-16 count

4. After adjustment, apply suitable locking compound as shown in the figure. (Do not apply locking compound on the screw slit.)



- The position in the figure above is the center of adjustment screw.

- A The count increases.
(The stylus moves toward inner grooves.)
- B The count decreases.
(The stylus moves outer grooves.)

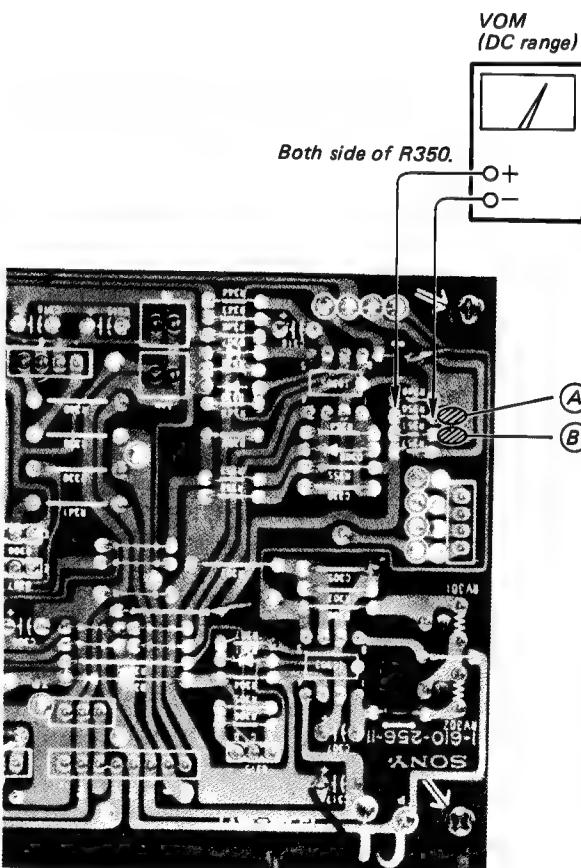
Note: This adjustment screw turns 360° and has no stoppers.

Arm Interrupter Adjustment

1. Press OPEN/CLOSE button and open the turntable module.
2. Solder the pattern A. If the pattern B is soldered, unsolder the pattern B.
3. Set the arm fully rightward.
(Be sure that the interrupter for tracking error detection is fully opened.)
4. Read the voltage on the VOM.
 - If the reading is 0.3 – 0.6 V, unsolder the pattern A.
 - If the reading is more than 0.6 V, unsolder the pattern A and solder the pattern B.

Adjustment Location:

— system control board —



ELECTRICAL ADJUSTMENTS

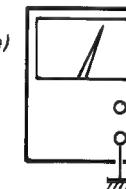
- Perform the adjustments with the set operating normally.
- In this set, the voltage is applied to the power supplying line (± 21 V) even if the POWER switch is turned OFF. When repairing the unit, unplug the power cord with the POWER switch ON (to discharge electrolytic capacitor after rectifying AC power supply voltage).
- Repeat the procedure 2 – 3 times.

Turntable Speed Adjustment

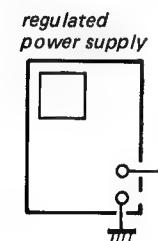
1. Connect frequency counter to test point.
- frequency counter
2. POWER switch : ON
START switch: ON
SPEED switch: 45 rpm
3. Adjust RV102 so that the frequency counter reading is 96.00 – 96.38 Hz.
4. SPEED switch: 33 rpm
5. Adjust RV101 so that the frequency counter reading is 71.11 – 71.39 Hz.

Note: When the adjustment of 45 rpm (RV102) is performed, it makes a difference of adjustment value of 33 rpm. So, the adjustment should be finally done by 33 rpm (RV101).

VOM
(DC 3 V range)

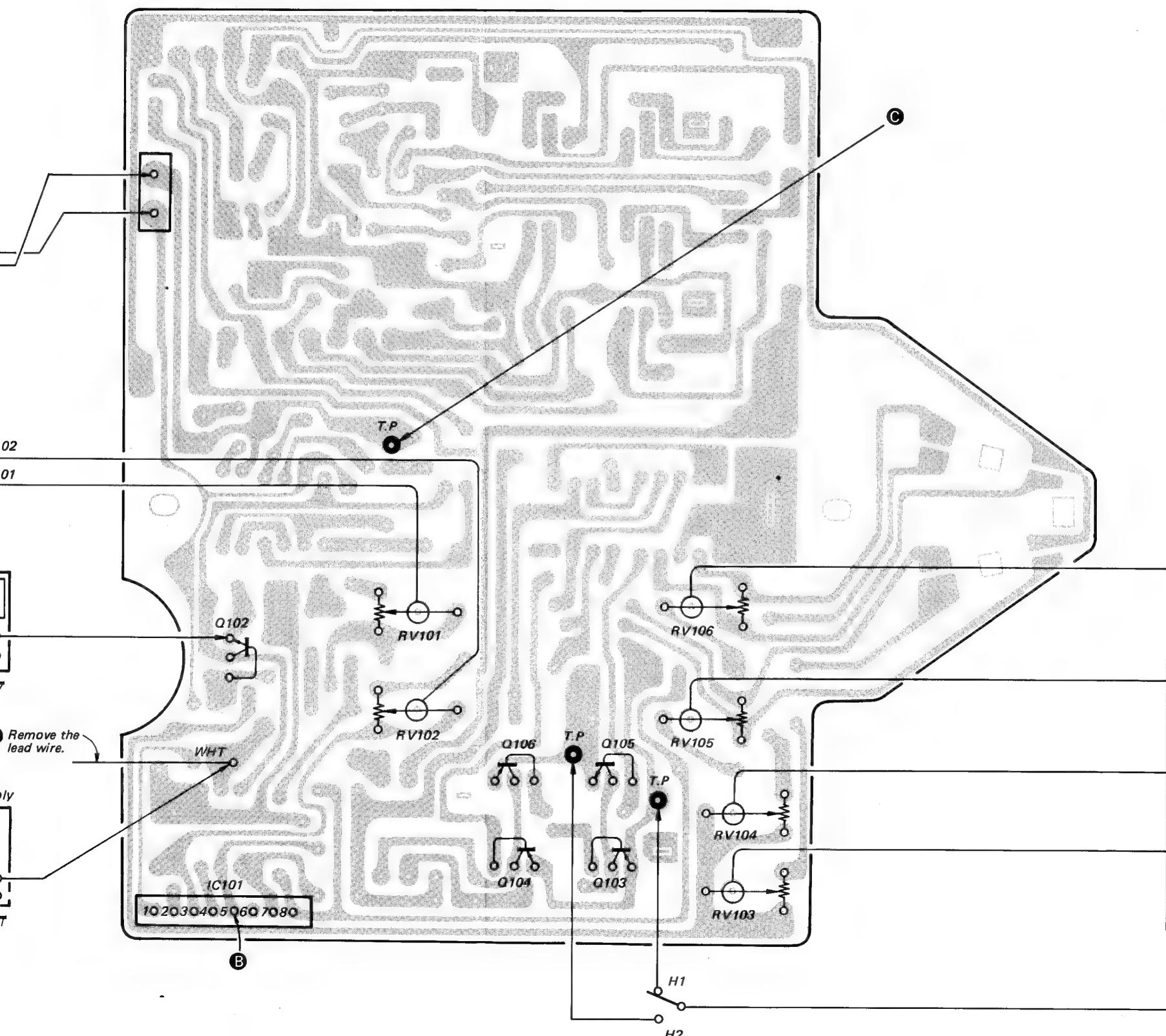


Remove the lead wire.



B

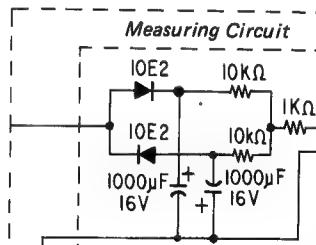
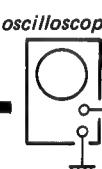
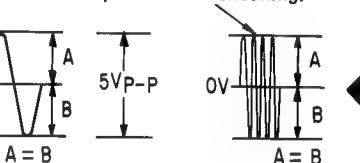
[SERVO AMP BOARD]



Gain/Offset Adjustment

1. Remove the lead wire **A** for the turntable driving signal from system control IC.
2. Connect the pattern **B** to **C**, and apply regulated power supply to the lead wire **A**.
3. Connect a VOM to the emitter of Q102, and adjust the regulated power supply voltage for DC1.5 V.
4. Adjust RV103 (H1) and RV104 (H2) so that the emitter voltage of Q103, 104 (H1) and Q105, 106 (H2) are 5 Vp-p. Gain Adjustment
5. Adjust RV105 (H1) and RV106 (H2) so that the emitter waveforms of Q103, 104 (H1) and Q105, 106 (H2) are as shown below (or so that DC potential is 0 V). Offset Adjustment
6. After adjustment, remove the lead wire connecting pattern **B** to **C** and solder the lead wire **A**.

Note: Set the sweep time longer for easy waveform checking.



ELECTRICAL ADJUSTMENTS

the adjustments with the set operating

set, the voltage is applied to the power line (± 21 V) even if the POWER switch is OFF. When repairing the unit, unplug power cord with the POWER switch ON (to discharge electrolytic capacitor after rectifying AC supply voltage).

the procedure 2 – 3 times.

Speed Adjustment

Set frequency counter to test point.

frequency counter

switch : ON

switch: ON

switch: 45 rpm

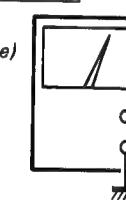
RV102 so that the frequency counter is 96.00 – 96.38 Hz.

switch: 33 rpm

RV101 so that the frequency counter is 71.11 – 71.39 Hz.

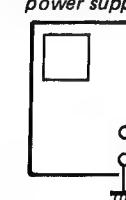
Even the adjustment of 45 rpm (RV102) is permitted, it makes a difference of adjustment value 33 rpm. So, the adjustment should be finally done by 33 rpm (RV101).

VOM (DC 3 V range)

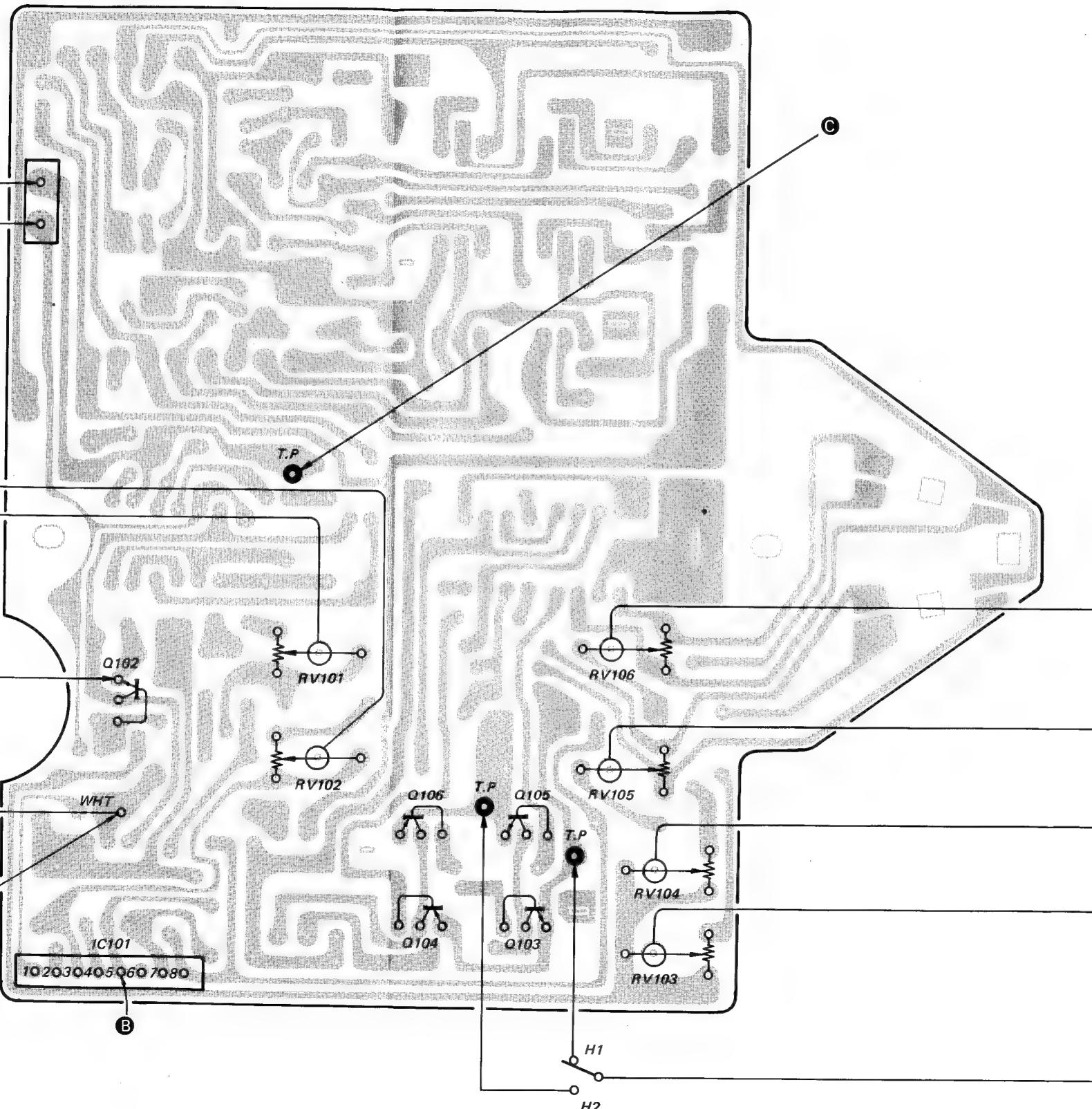


A Remove the lead wire.

regulated power supply



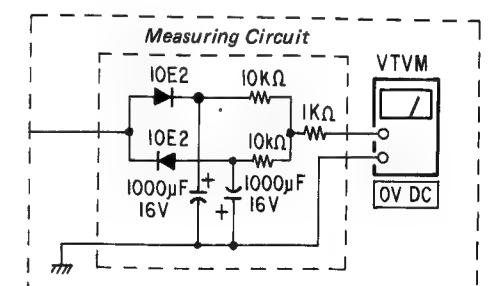
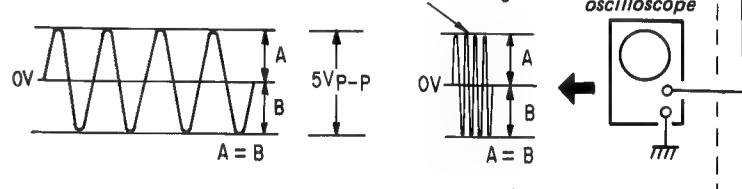
[SERVO AMP BOARD]

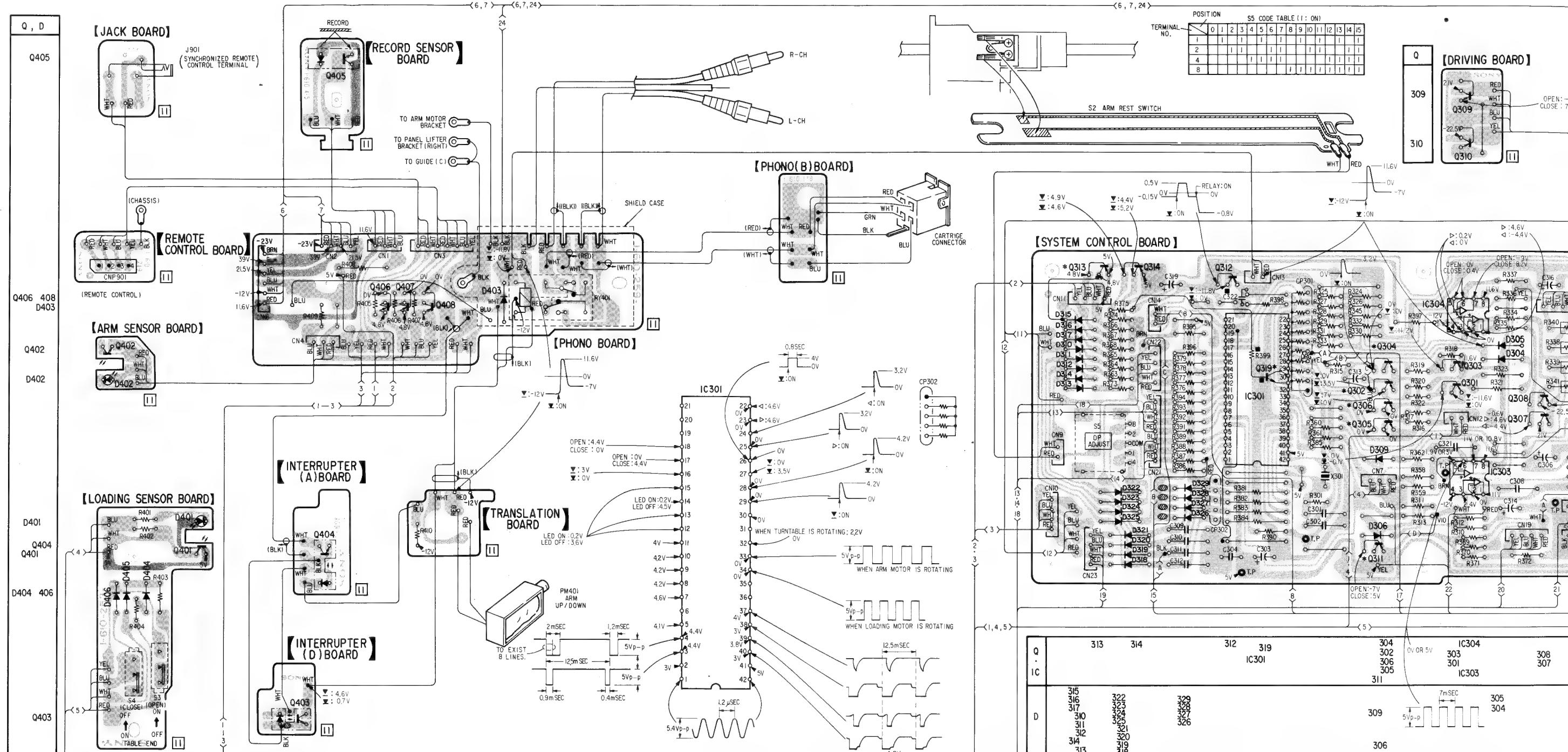


Gain/Offset Adjustment

1. Remove the lead wire A for the turntable driving signal from system control IC.
2. Connect the pattern B to C, and apply regulated power supply to the lead wire A.
3. Connect a VOM to the emitter of Q102, and adjust the regulated power supply voltage for DC1.5 V.
4. Adjust RV103 (H1) and RV104 (H2) so that the emitter voltage of Q103, 104 (H1) and Q105, 106 (H2) are 5 Vp-p. Gain Adjustment
5. Adjust RV105 (H1) and RV106 (H2) so that the emitter waveforms of Q103, 104 (H1) and Q105, 106 (H2) are as shown below (or so that DC potential is 0 V). Offset Adjustment
6. After adjustment, remove the lead wire connecting pattern B to C and solder the lead wire A.

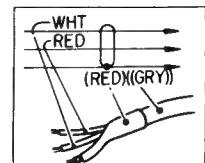
Note: Set the sweep time longer for easy waveform checking.



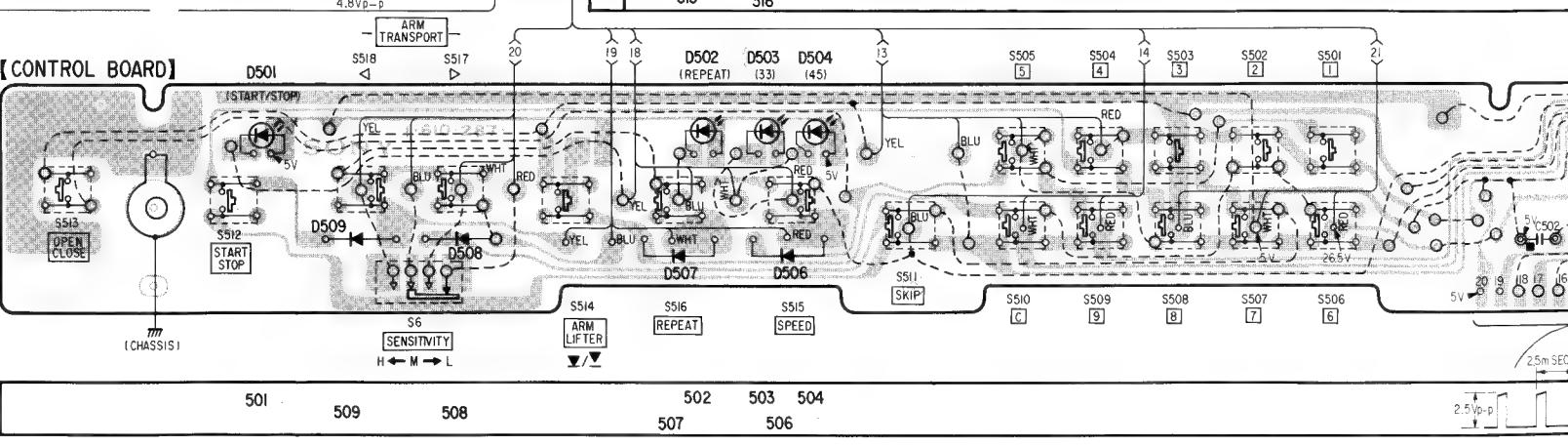
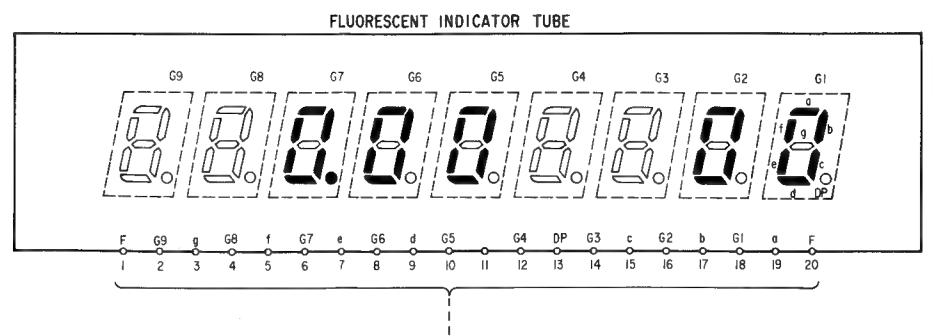


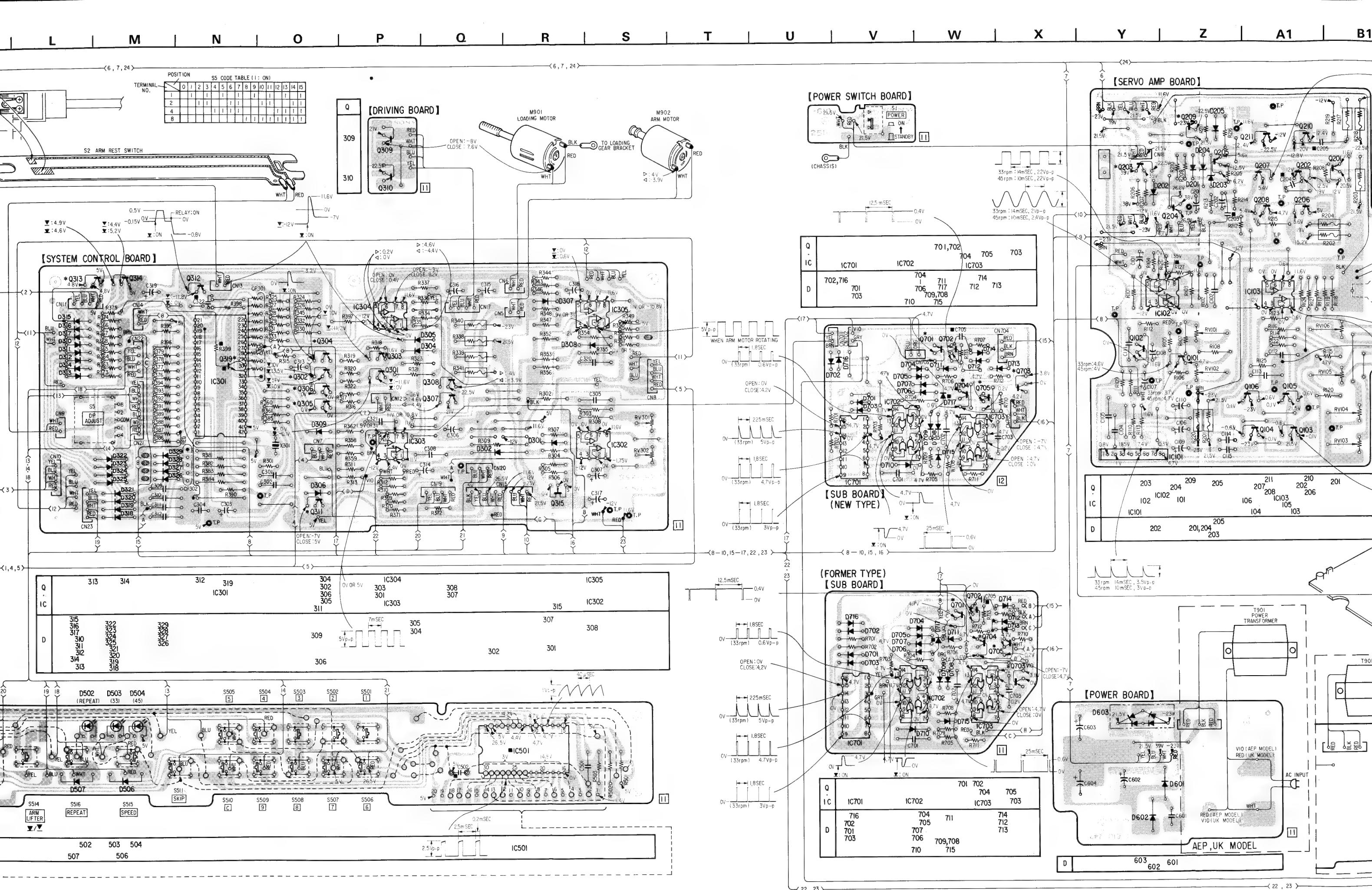
Note

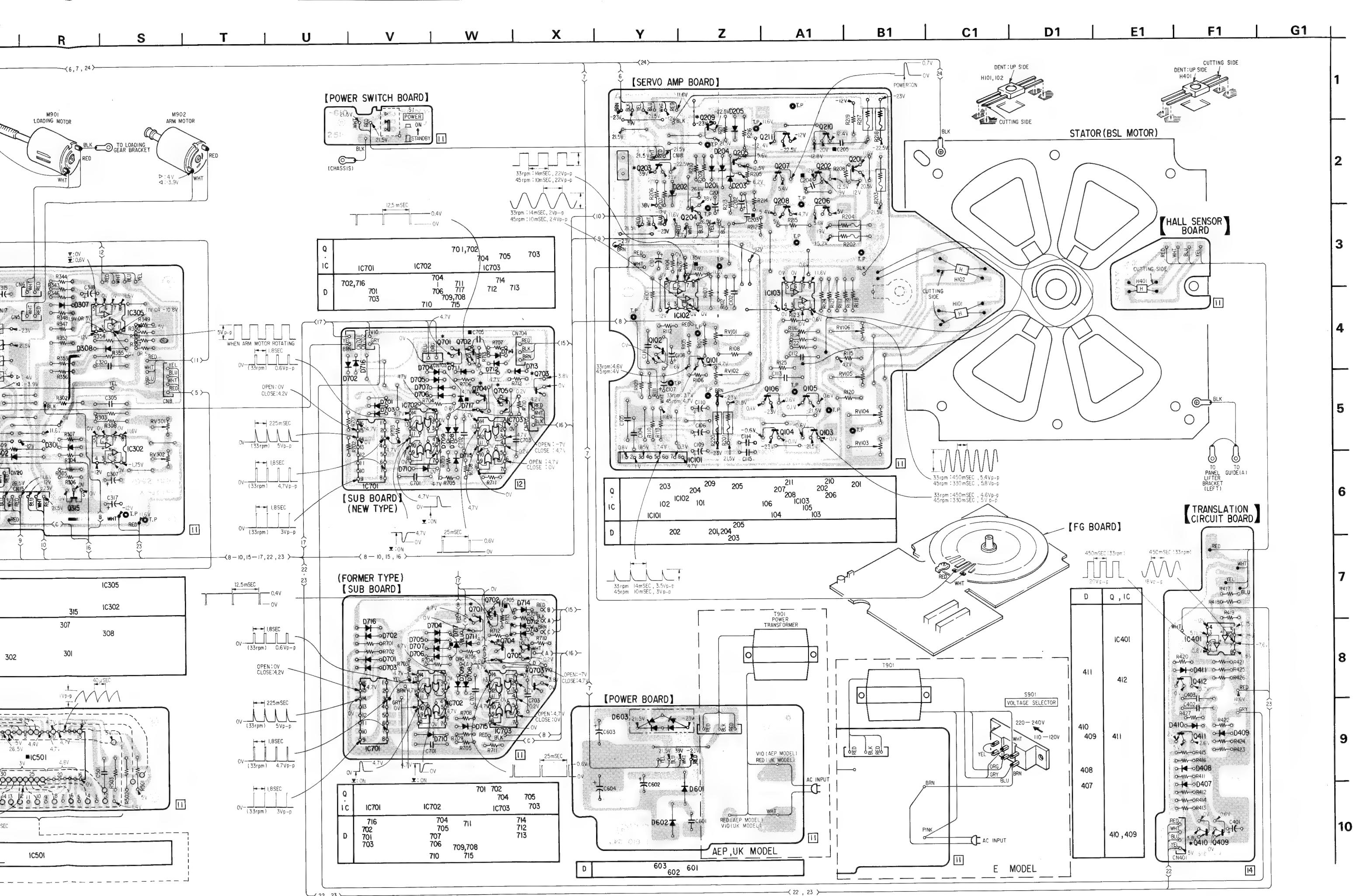
- Color code of sleeves over the end of the jacket.



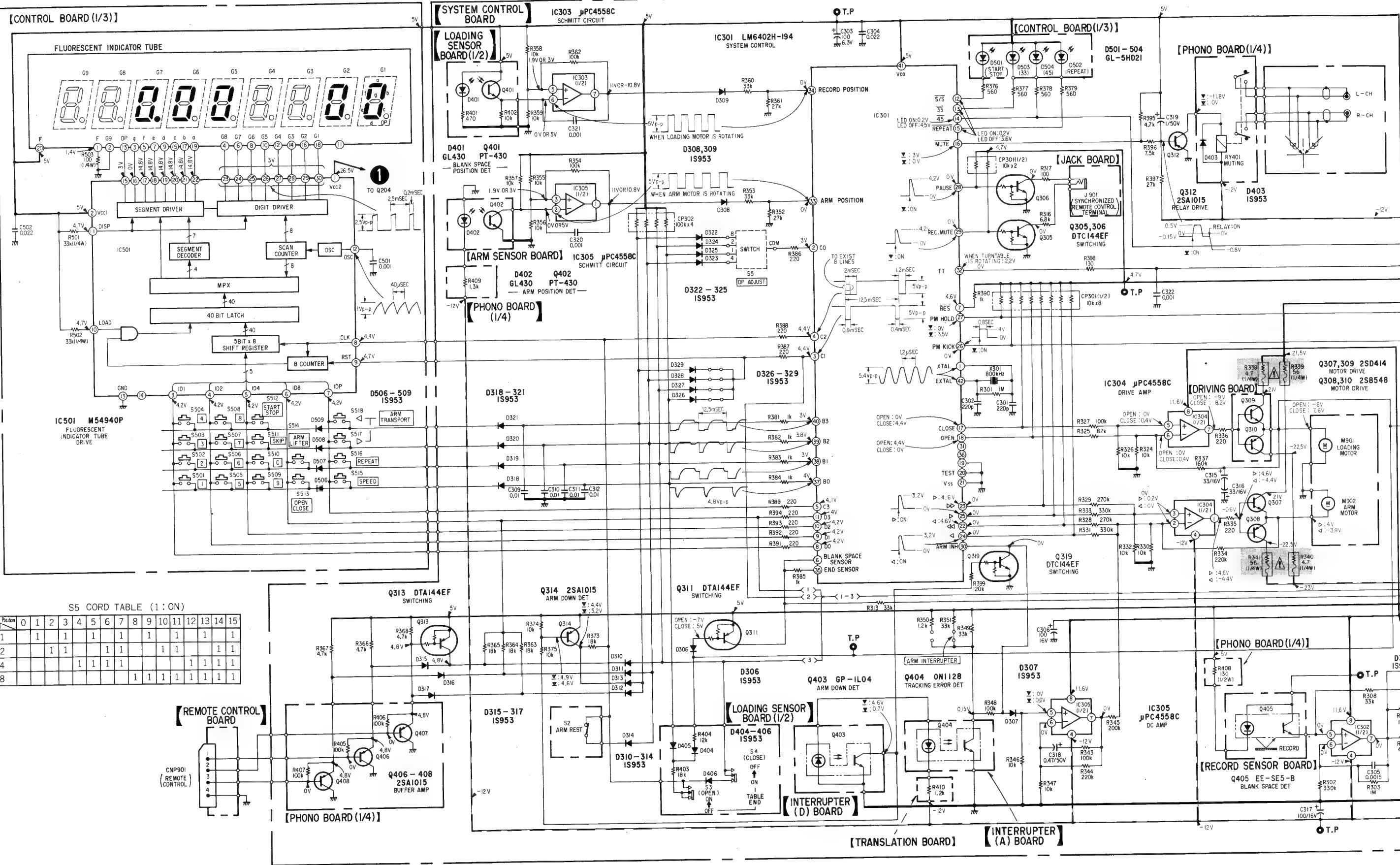
- ○— : parts extracted from the component side.
- —●— : parts extracted from the conductor side.
- * : transistor with resistor
- . . . : B+ pattern

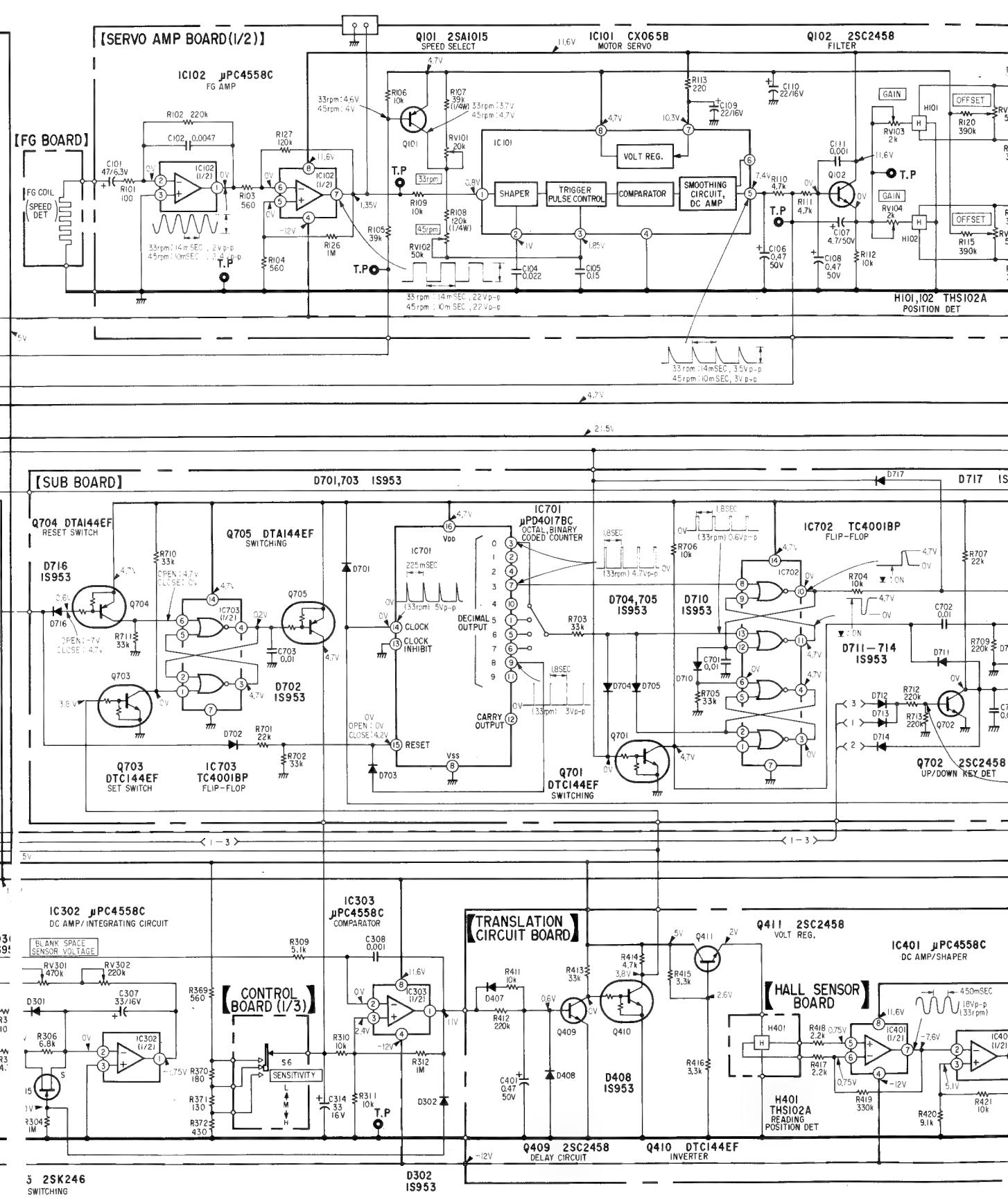
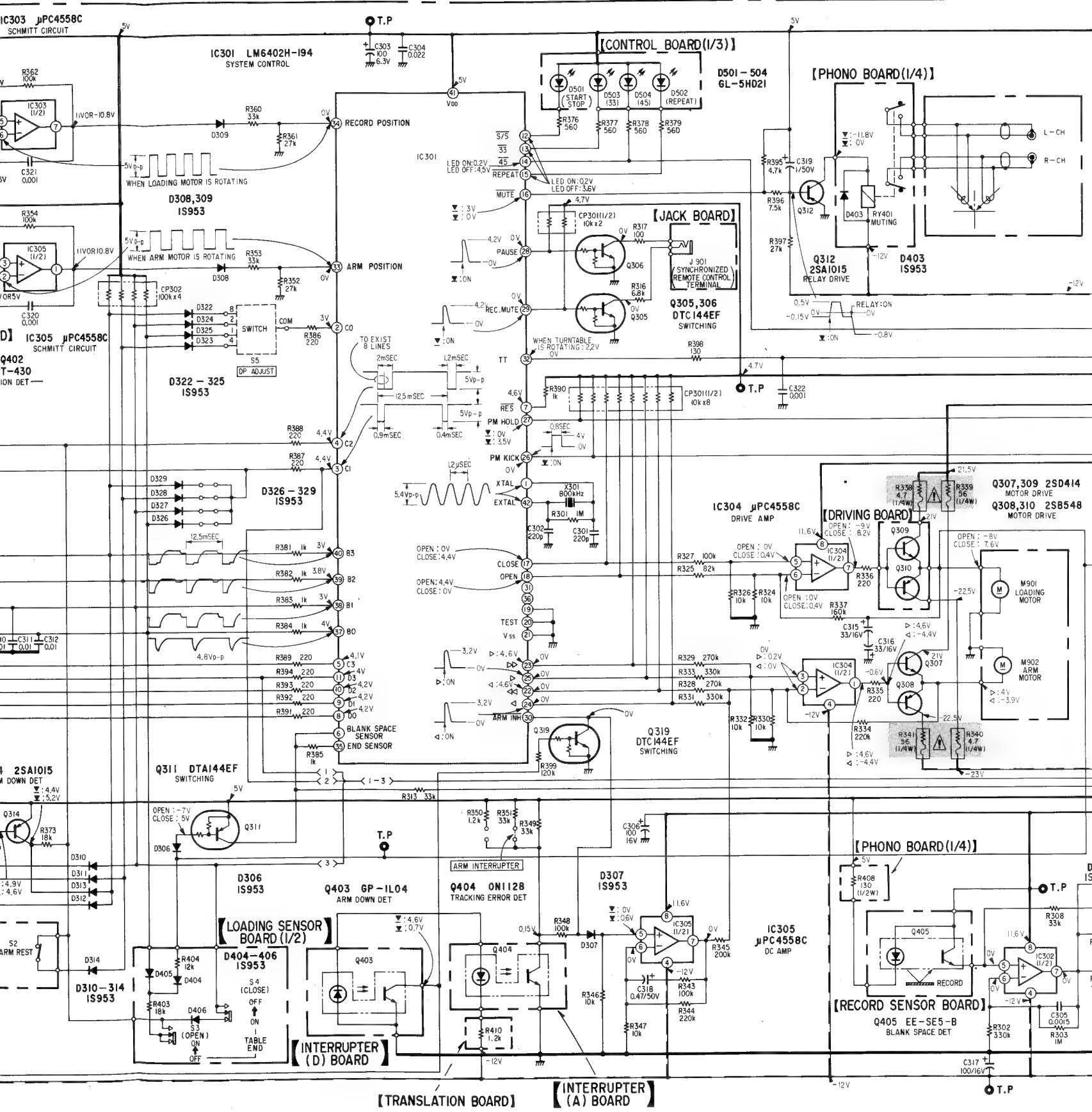


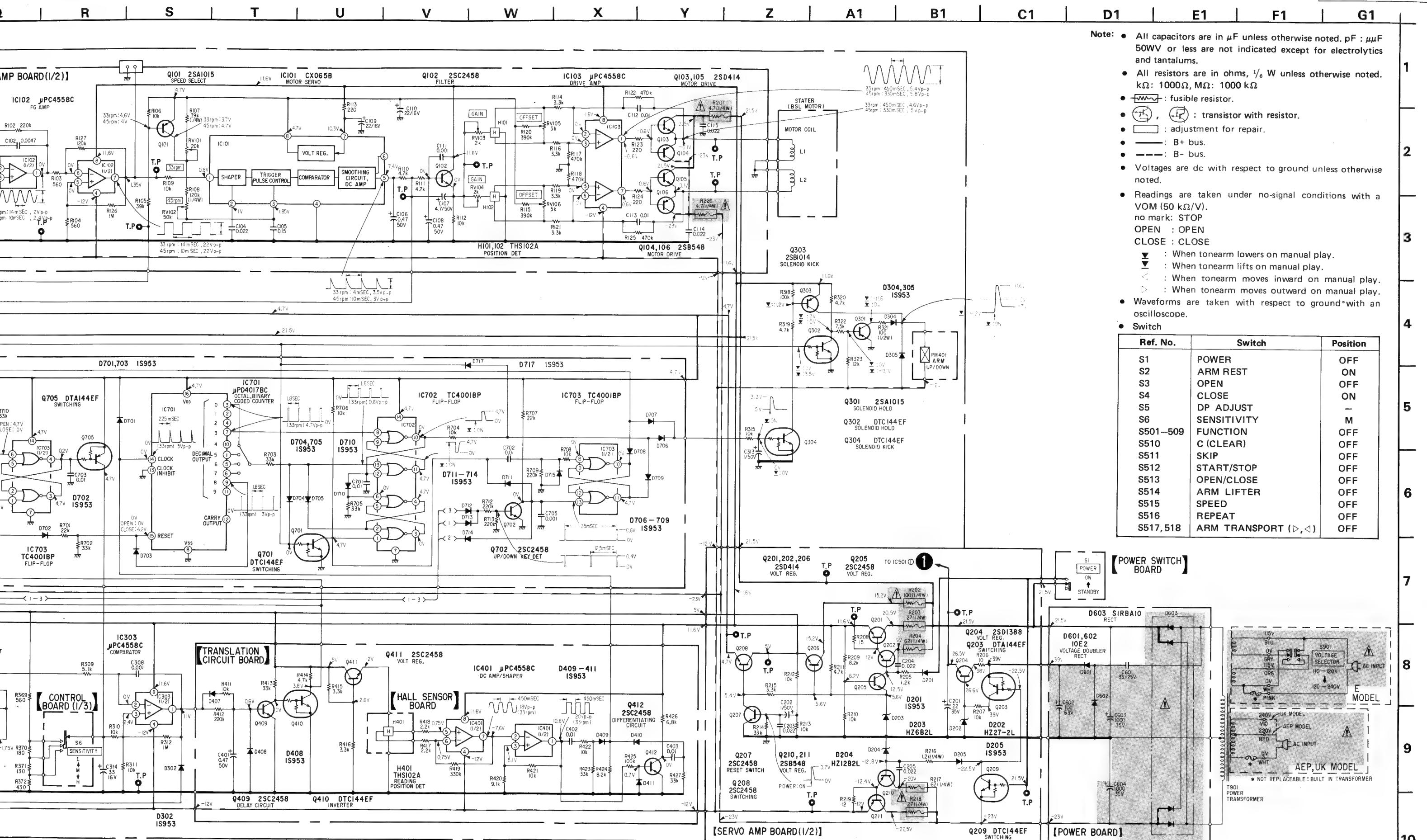




4-2. SCHEMATIC DIAGRAM







Note: Voltages are measured with a VOM (50k Ω /V).

Note:

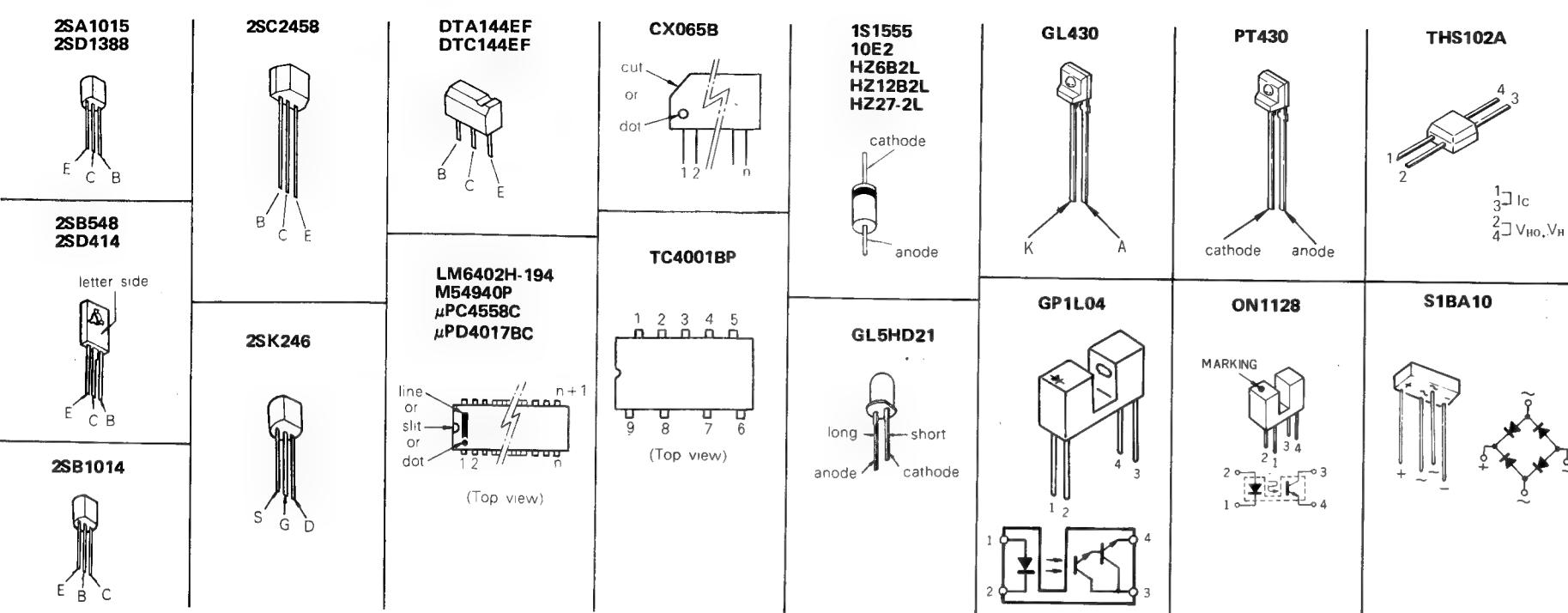
- All capacitors are in μF unless otherwise noted. pF : μF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, $1/8$ W unless otherwise noted. $\text{k}\Omega$: 1000 Ω , $\text{M}\Omega$: 1000 k Ω .
- --- : fusible resistor.
- --- : transistor with resistor.
- --- : adjustment for repair.
- --- : B+ bus.
- --- : B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (50 k Ω /V).
- no mark: STOP
- OPEN : OPEN
- CLOSE : CLOSE
 - ∇ : When tonearm lowers on manual play.
 - ∇ : When tonearm lifts on manual play.
 - \leftarrow : When tonearm moves inward on manual play.
 - \rightarrow : When tonearm moves outward on manual play.
- Waveforms are taken with respect to ground with an oscilloscope.
- Switch

Ref. No.	Switch	Position
S1	POWER	OFF
S2	ARM REST	ON
S3	OPEN	OFF
S4	CLOSE	ON
S5	DP ADJUST	—
S6	SENSITIVITY	M
S501-509	FUNCTION	OFF
S510	C (CLEAR)	OFF
S511	SKIP	OFF
S512	START/STOP	OFF
S513	OPEN/CLOSE	OFF
S514	ARM LIFTER	OFF
S515	SPEED	OFF
S516	REPEAT	OFF
S517, 518	ARM TRANSPORT (\rightarrow, \leftarrow)	OFF

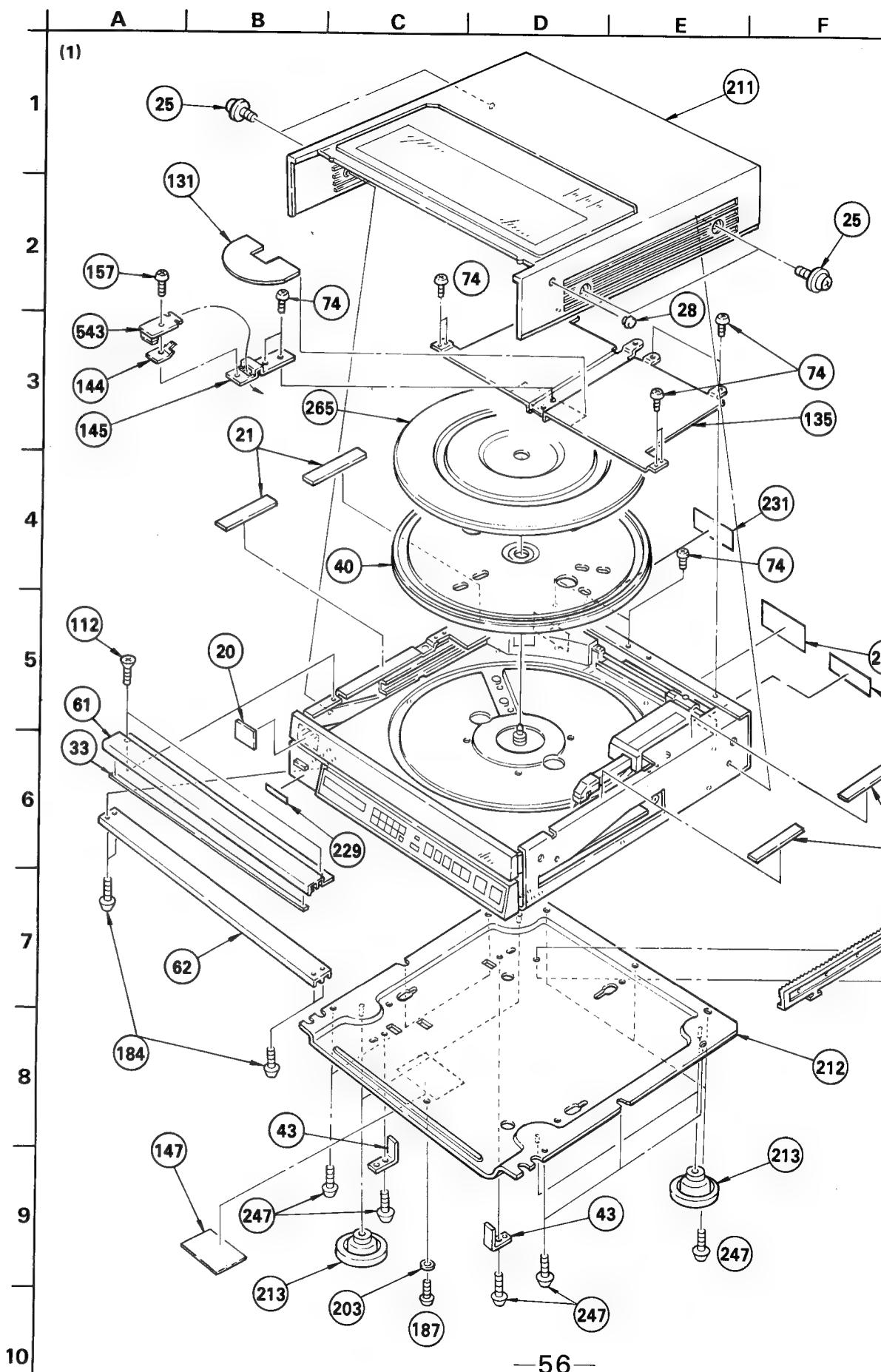
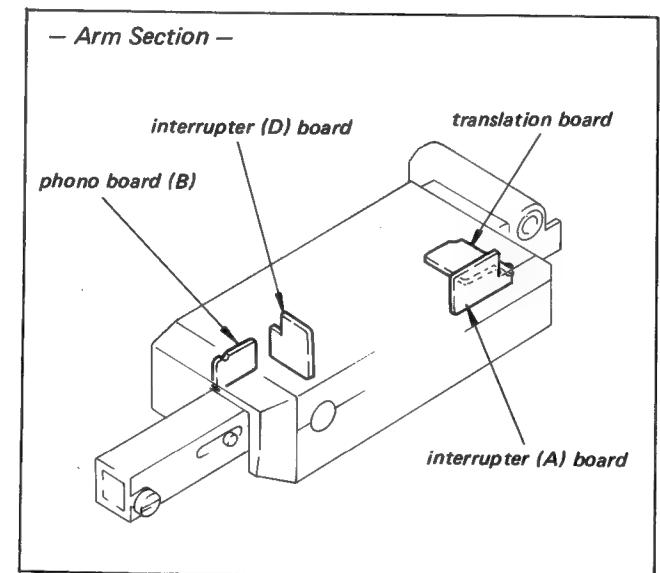
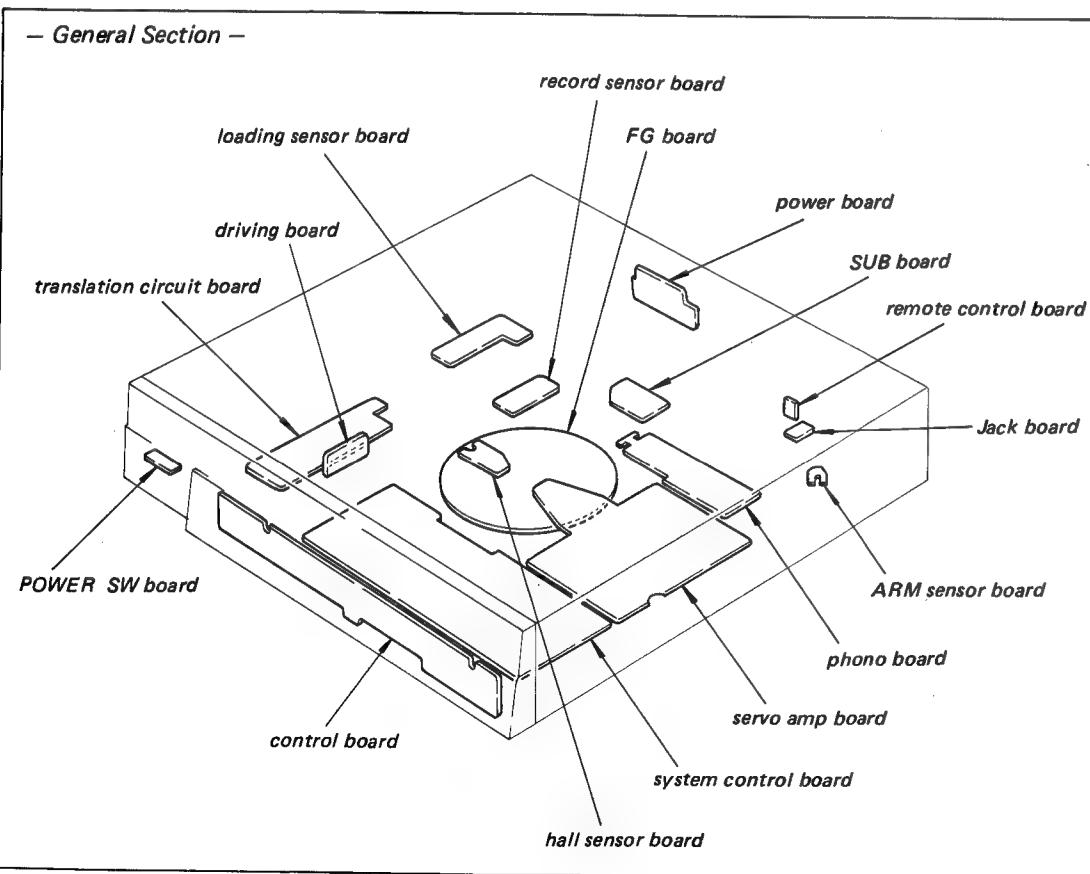
Note: The components identified by shading and mark \triangle are critical for safety. Replace only with part number specified.

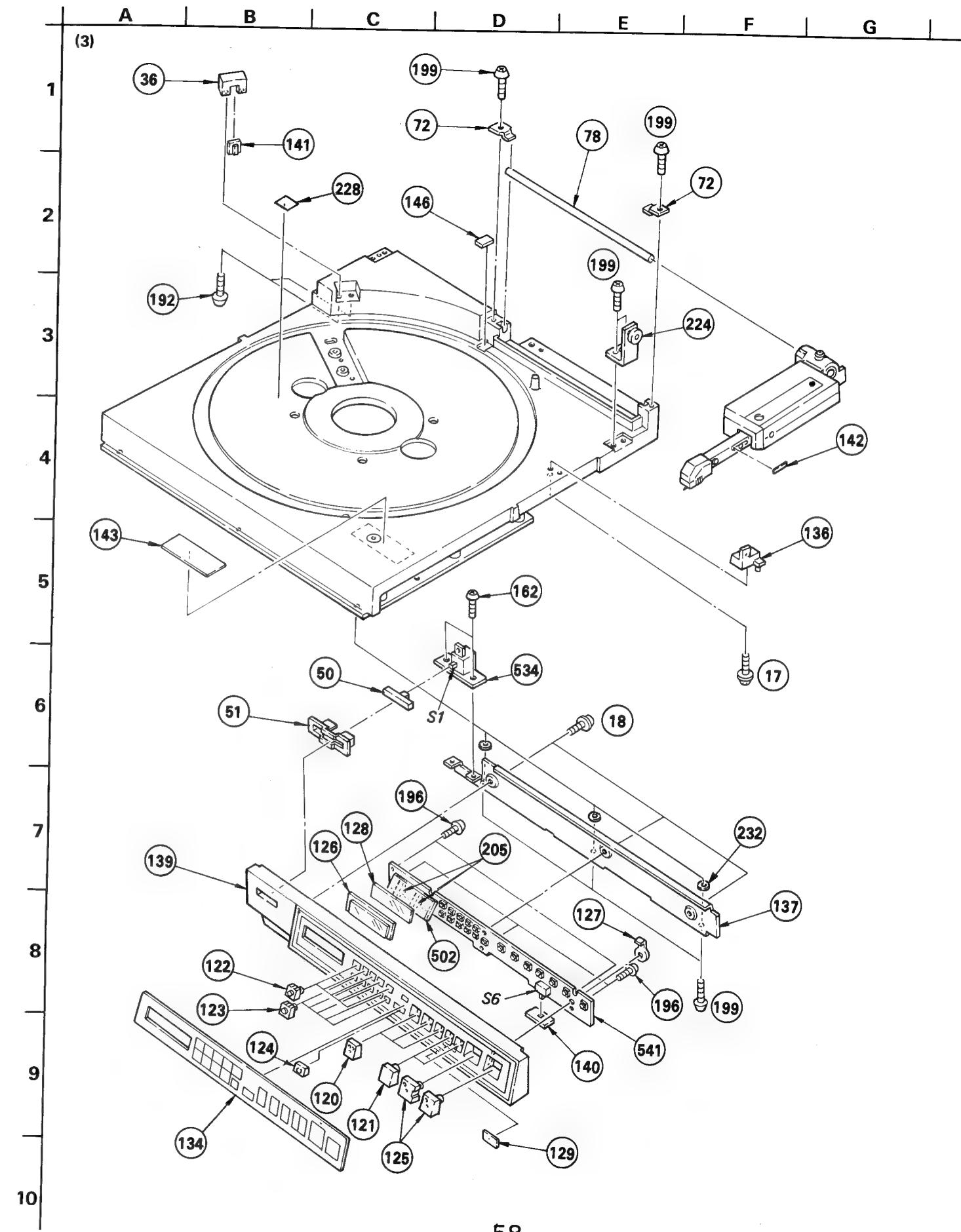
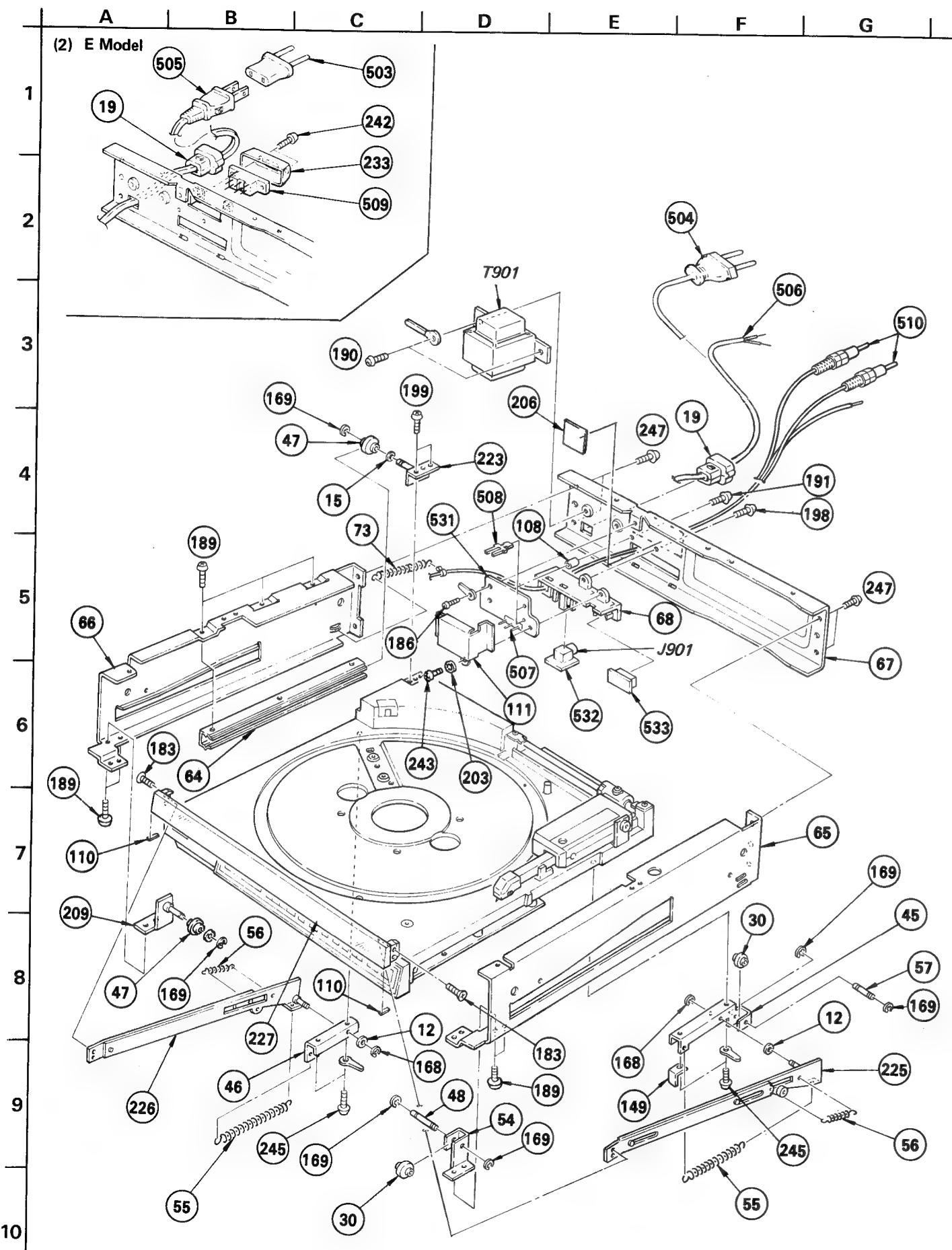
SECTION 5
EXPLODED VIEWS AND PARTS LIST

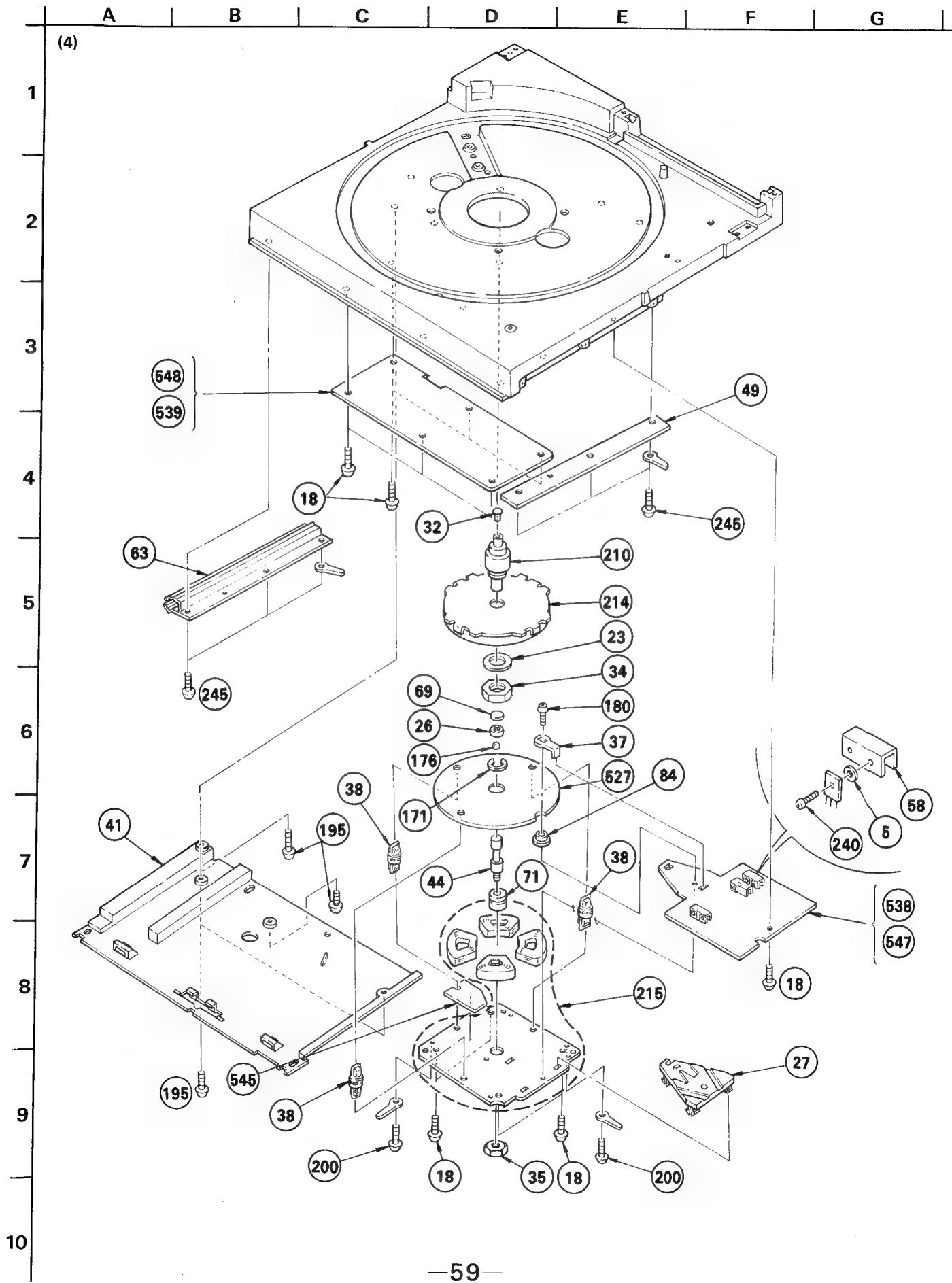
• Semiconductor Lead Layouts

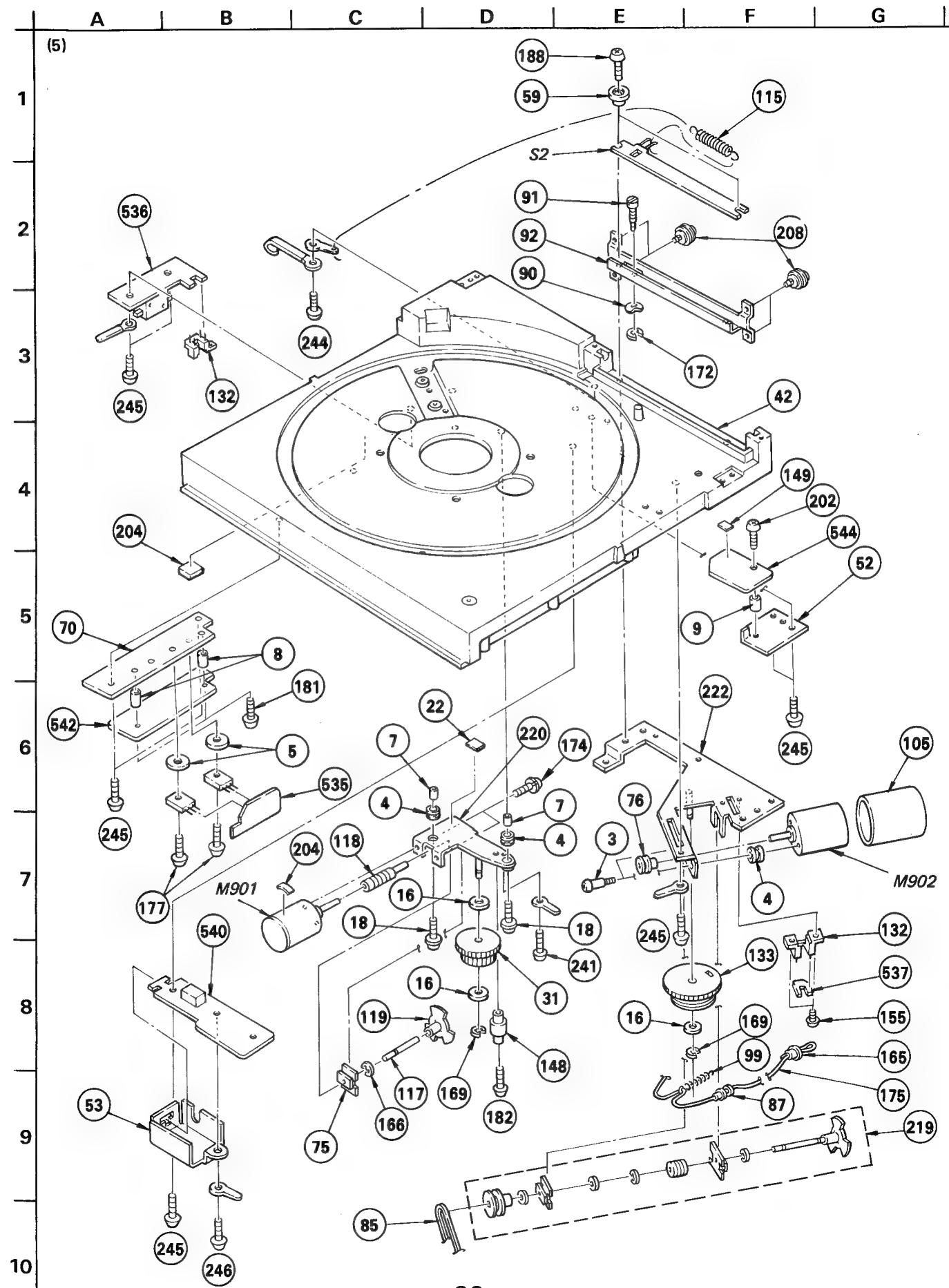


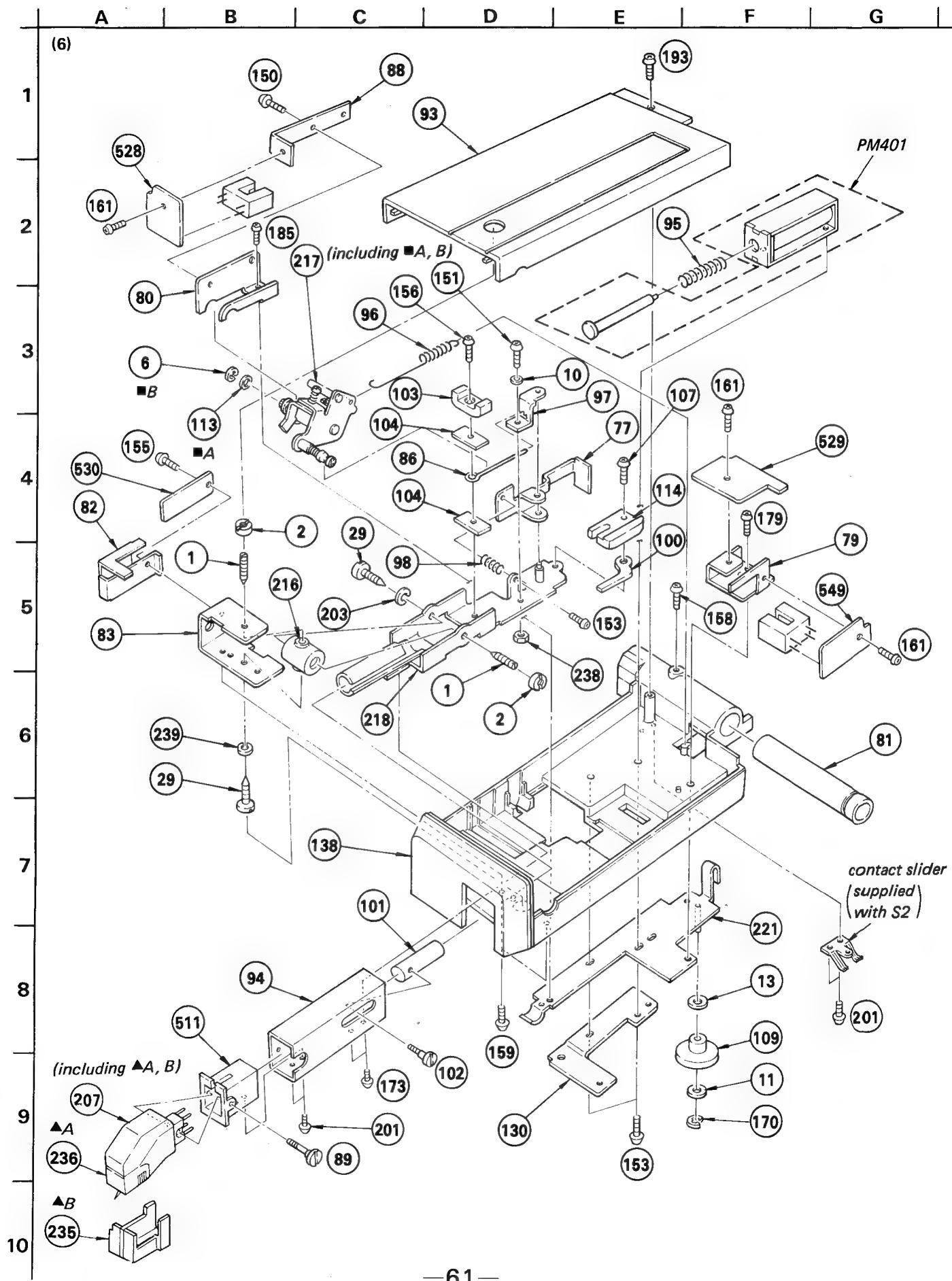
CIRCUIT BOARDS LOCATION











GENERAL SECTION

No.	Part No.	Description
1	2-203-518-61	SCREW, PIVOT
2	2-203-519-00	NUT (A), LOCK, PIVOT
3	3-570-027-00	SCREW, MOTOR
4	3-570-118-00	CUSHION, MOTOR
5	3-572-365-01	SHEET (A), INSULATING
6	3-618-189-00	RING, RETAINING
7	3-654-058-00	SPACER 3X3
8	3-654-603-00	SPACER
9	3-657-842-01	SPACER (3X4)
10	3-701-437-21	WASHER
11	3-701-439-11	WASHER
12	3-701-439-21	WASHER
13	3-701-440-11	WASHER, 3.5
14	.....
15	3-701-441-11	WASHER
16	3-701-441-21	WASHER
17	3-703-135-00	SCREW, TAPPING
18	3-703-137-00	SCREW, TAPPING
19	3-703-244-00	(AEP,UK)...BUSHING, CORD
19	3-703-571-00	(E)...BUSHING (S), CORD
20	3-703-708-01	STICKER, SONY SYMBOL (18)
21	3-831-441-11	SHEET, PROTECTION
22	3-831-441-XX	CUSHION
23	3-849-306-00	WASHER (TELESCOPIC ANTENNA)
24	0-056-028-00	WASHER, PLAIN, 14 DIA.
25	4-820-330-51	SCREW, BW, PLUS MINUS
26	4-852-007-00	RETAINER (A), THRUST
27	4-857-642-00	HOLDER, PC BOARD
28	4-874-260-01	CAP, BLIND
29	4-877-816-00	SHAFT, PIVOT
30	4-879-509-00	ROLLER (A)
31	4-879-514-00	WHEEL (A), WORM
32	4-879-541-00	CAP, CENTER
33	4-879-624-11	PROTECTOR (F)
34	4-879-701-00	NUT, HEXAGON
35	4-879-758-00	NUT, SHAFT, MOTOR
36	4-879-775-21	HOLDER, LAMP
37	4-881-629-00	PLATE (A), GROUND
38	4-881-636-11	SUPPORT (TMD), PC
39	.....
40	4-885-502-11	TURNTABLE
41	4-885-504-00	COVER, REAR
42	4-885-506-11	FRAME
43	4-885-509-00	PLATE, FUNCTION, LOADING SWITCH

GENERAL SECTION

No.	Part No.	Description
44	4-885-515-00	SHAFT, MOTOR
45	4-885-518-00	BRACKET (RIGHT), PANEL LIFTER
46	4-885-519-00	BRACKET (LEFT), PANEL LIFTER
47	4-885-520-00	ROLLER (A), GUIDE
48	4-885-524-00	SHAFT (C), GUIDE ROLLER
49	4-885-527-00	GUIDE (C)
50	4-885-531-00	KNOB, POWER
51	4-885-532-00	GUIDE, POWER KNOB
52	4-885-535-00	SUPPORT, TRANSPORT
53	4-885-549-00	PLATE, SHIELD
54	4-885-550-00	BRACKET (RIGHT), ROLLER
55	4-885-552-00	SPRING, TENSION
56	4-885-553-00	SPRING, TENSION
57	4-885-557-00	SHAFT (D), GUIDE ROLLER
58	4-885-562-00	HEAT SINK
59	4-885-563-00	COLLAR, ARM SWITCH
60	4-885-566-00	PLATE, RACK
61	4-885-567-00	PANEL, UPPER
62	4-885-568-00	REINFORCEMENT
63	4-885-571-02	GUIDE (A)
64	4-885-572-02	GUIDE (B)
65	4-885-580-00	PLATE (RIGHT), SIDE
66	4-885-581-00	PLATE (LEFT), SIDE
67	4-885-583-01	(AEP,UK)...PANEL, BACK
67	4-885-583-21	(E).....PANEL, BACK
68	4-885-584-00	TERMINAL BOARD, REMOTE CONTROL
69	4-885-589-00	WASHER, THRUST
70	4-885-590-00	HEAT SINK
71	4-885-591-00	SPACER, SHAFT, MOTOR
72	4-885-595-11	PLATE, FIXED, GUIDE BAR
73	4-885-597-00	SPRING, TENSION
74	4-885-599-00	SCREW, FITTING, REINFORCEMENT
75	4-885-703-00	GUIDE, WORM SHAFT
76	4-885-704-03	PULLEY, MOTOR
77	4-885-707-00	PLATE, ADJUSTMENT
78	4-885-709-00	BAR, GUIDE
79	4-885-710-00	BRACKET, PHOTO
80	4-885-712-00	RETAINER, PUSH ROD
81	4-885-717-00	SLIDER
82	4-885-718-00	PLATE, SHIELD
83	4-885-721-00	BRIDGE, ARM
84	4-885-727-00	SPACER
85	4-885-735-00	BELT, DRIVING
86	4-885-737-00	WIRE
87	4-885-744-00	STOPPER, WIRE
88	4-885-745-00	BRACKET (D), PHOTO

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "▲" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:

MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
 UA...: μA..., UPA...: μPA..., UPC...: μPC,
 UPD...: μPD...

GENERAL SECTION			GENERAL SECTION			GENERAL SECTION			GENERAL SECTION		
No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
89	4-885-746-00	SCREW, FITTING, CARTRIDGE	134	4-888-924-00	SHEET (A), CONTROL	179	7-682-147-09	SCREW +P 3X6	224	X-4888-907-0	BRACKET (D) ASSY, GUIDE ROLLER
90	4-885-747-00	WASHER (H)	135	4-888-926-02	REINFORCEMENT (UPPER)	180	7-682-149-13	SCREW +P 3X10	225	4-888-908-0	LIFTER (RIGHT) ASSY, PANEL
91	4-885-748-00	PIN, ADJUSTMENT	136	4-888-927-00	REST, ARM	181	7-682-151-01	SCREW +P 3X14	226	4-888-909-0	LIFTER (LEFT) ASSY, PANEL
92	4-885-750-00	GUIDE, ROLLER	137	4-888-930-00	BRACKET (B), CONTROL PANEL	182	7-682-152-01	SCREW +P 3X16	227	X-4888-910-0	PANEL ASSY, FRONT
93	4-885-753-02	COVER, ARM	138	4-888-931-00	BASE, ARM	183	7-682-245-09	SCREW +K 3X4	228	3-701-030-00	LABEL, SERIAL NUMBER
94	4-885-760-02	PIPE, ARM	139	4-888-932-13	PANEL, CONTROL	184	7-682-544-04	SCREW +B 3X3	229	3-701-690-00	(UK)....LABEL (MADE IN JAPAN)
95	4-885-761-00	SPRING, COMPRESSION	140	4-888-933-00	PLATE, BLIND	185	7-682-544-09	SCREW +B 3X3	230	3-703-043-21	(UK)....LABEL, CAUTION, MAIN
96	4-885-762-00	SPRING, TENSION	141	4-888-934-00	WINDOW, LAMP	186	7-682-545-04	SCREW +B 3X4	231	3-703-396-00	(UK)....LABEL, CAUTION
97	4-885-765-00	RETAINER, WIRE	142	4-888-943-00	LABEL, STYLUS PRESSURE	187	7-682-546-04	SCREW +B 3X5	232	4-830-092-00	WASHER, FIBER
98	4-885-766-00	SPRING, COMPRESSION	143	4-888-944-00	LABEL, DP ADJ	188	7-682-550-09	SCREW +B 3X12	233	4-886-724-00	(E)....COVER, SELECTION, VOLTAGE
99	4-885-767-00	SPRING, TENSION	144	4-888-945-00	SPRING, LEAF	189	7-682-646-01	SCREW +PS 3X5	234	4-888-935-00	(E)....LABEL, MODEL NUMBER
100	4-885-768-00	WEIGHT (2)	145	4-888-946-00	BRACKET, SENSOR	190	7-682-947-01	SCREW +PSW 3X6	234	4-888-937-00	(AEP)....LABEL, MODEL NUMBER
101	4-885-770-00	WEIGHT, ADJUSTMENT	146	4-888-948-00	SENSOR (M)	191	7-682-948-01	SCREW +PSW 3X8	234	4-888-938-00	(UK)....LABEL, MODEL NUMBER
102	4-885-771-00	SCREW, ADJUSTMENT	147	4-888-951-11	LABEL, SERVICE	192	7-685-134-11	SCREW +BTP 2.6X8 TYPE2 NON-SLIT	235	2-231-652-00	COVER, STYLUS TIP
103	4-885-773-00	WEIGHT (S)	148	4-888-952-00	GUIDE (A), RACK	193	.....	.....	236	A-4587-071-B	STYLUS TIP (ND-250G)
104	4-885-774-00	BASE	149	4-888-954-00	PLATE, STOPPER	194	.....	.....	237	7-621-255-22	SCREW +P 2X4
105	4-885-775-00	CAP, MOTOR	150	7-621-255-12	SCREW +P 2X3	195	7-685-147-21	SCREW +P 3X10 TYPE2 SLIT	238	7-622-205-05	NUT, N2
106	.....		151	7-621-255-22	SCREW +P 2X4	196	7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S	239	7-623-208-22	WASHER, SW 3 TYPE2
107	4-885-799-00	SCREW, ADJUSTMENT	152	.....		197	.....	.....	240	7-628-146-00	SCREW +P 3X5
108	4-886-709-00	COLLAR, TERMINAL BOARD	153	7-621-255-42	SCREW +P 2X6	198	7-685-545-14	SCREW +BTP 3X6 TYPE2 N-S	241	7-682-144-01	SCREW +P 3X3
109	4-886-714-00	ROLLER, GUIDE	154	.....		199	7-685-647-79	SCREW +BTP 3X10 TYPE2 SLIT	242	7-682-547-09	SCREW +B 3X6
110	4-886-719-00	SHEET, PROTECTION	155	7-621-259-25	SCREW +P 2.6X4	200	7-685-750-01	SCREW +PTT 3X5 (S)	243	7-685-546-14	SCREW BTP 3X8
111	4-888-958-00	COVER, INSULATING	156	7-621-259-55	SCREW +P 2.6X8	201	7-685-799-04	SCREW +PTT 1.7X2.5	244	7-685-646-21	SCREW BTP 3X8
112	4-886-722-00	SCREW, FITTING, UPPER PANEL	157	7-621-284-10	SCREW +P 2.6X5	202	7-685-872-01	SCREW +BTT 3X8 (S)	245	7-687-647-21	SCREW BTP 3X10
113	4-887-301-00	RETAINER, PUSH ROD	158	7-621-770-87	SCREW +P 2.6X5	203	7-688-003-11	W 3, MIDDLE	246	7-685-648-21	SCREW BTP 3X12
114	4-887-310-00	WEIGHT (A)	159	7-621-772-08	SCREW +B 2X3	204	9-911-840-XX	CUSHION	247	7-685-870-01	SCREW BTP 3X5
115	4-887-956-00	SPRING, TENSION	160	.....		205	9-911-847-XX	CUSHION			
116	.....		161	7-621-775-00	SCREW +B 2.6X3	206	9-911-863-XX	(AEP)....SHEET (B), INSULATING			
117	4-888-902-00	SHAFT (A), WORM	162	7-621-775-10	SCREW +B 2.6X4	207	A-4505-089-A	CARTRIDGE ASSY (XL-250G)			
118	4-888-904-00	WORM (A)	163	.....		208	X-3701-109-0	PULLEY ASSY			
119	4-888-905-00	DISK, SLIT	164	.....		209	4-885-505-0	BRACKET (LEFT) ASSY, ROLLER			
120	4-888-907-04	KNOB (S.R.A)	165	7-623-616-01	EYELET, 2X3	210	X-4885-506-0	BEARING ASSY, MOTOR			
121	4-888-908-00	KNOB, TRANSPORT	166	7-624-102-04	STOP RING 1.5, TYPE -E	211	X-4885-512-0	COVER ASSY, DUST			
122	4-888-909-00	KNOB (UPPER), PROGRAM	167	.....		212	4-885-513-0	PLATE ASSY, BOTTOM			
123	4-888-910-00	KNOB (LOWER), PROGRAM	168	7-624-105-04	STOP RING 2.3, TYPE -E	213	X-4885-514-0	INSULATOR ASSY			
124	4-888-911-00	KNOB, SKIP	169	7-624-106-04	STOP RING 3.0, TYPE -E	214	X-4885-515-1	ROTOR ASSY			
125	4-888-912-00	KNOB (S.O)	170	7-624-133-04	STOP RING 3, TYPE-CE	215	X-4885-516-1	STATOR ASSY			
126	4-888-913-00	PLATE, FROSTED	171	7-624-133-94	STOP RING 15, TYPE-CE	216	X-4885-711-0	HOLDER ASSY, BEARING			
127	4-888-915-00	PLATE, GROUND, PANEL	172	7-624-190-81	STOP RING 2, TYPE-CS	217	X-4885-714-1	LIFTER ASSY			
128	4-888-917-00	SHEET, FROSTED	173	7-627-553-37	SCREW, PRECISION +P 2X3	218	X-4885-715-1	JOINT ASSY			
129	4-888-918-00	LABEL, SENSOR SELECTION	174	7-628-253-95	SCREW +PS 2.6X4	219	X-4888-902-0	WORM ASSY			
130	4-888-919-00	PLATE, FIXED, ARM	175	9-911-825-32	STRING, TETRON DIAL (0.3MM)	220	4-888-903-0	BRACKET ASSY, GEAR, LOADING			
131	4-888-920-00	SHEET, SENSOR	176	7-671-114-01	BALL 4, STEEL	221	X-4888-904-0	ROLLER ASSY (C), GUIDE			
132	4-888-922-00	COVER, PHOTO	177	7-682-146-01	SCREW +P 3X5	222	4-888-905-0	BRACKET ASSY, MOTOR			
133	4-888-923-11	WHEEL, WORM	178	7-682-146-13	SCREW +P 3X5	223	4-888-906-0	BRACKET (C) ASSY, GUIDE ROLLER			

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 MF:μF, PF:μμF.
 RESISTORS:
 · All resistors are in ohms.
 · F : nonflammable
 COILS
 · MMH : mH, UH : μH
 SEMICONDUCTORS
 In each case, U : μ, for example:
 UA...: μA..., UPA...: μPA..., UPC...: μPC,
 UPD...: μPD...

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 UPD...: μPD...

ELECTRICAL PARTS

Ref. No.	Part No.	Description
D401	8-719-902-96	DIODE GL-430
D402	8-719-902-96	DIODE GL-430
D403	8-719-815-55	DIODE 1S1555
D404	8-719-815-55	DIODE 1S1555
D405	8-719-815-55	DIODE 1S1555
D406	8-719-815-55	DIODE 1S1555
D407	8-719-815-55	DIODE 1S1555
D408	8-719-815-55	DIODE 1S1555
D409	8-719-815-55	DIODE 1S1555
D410	8-719-815-55	DIODE 1S1555
D411	8-719-815-55	DIODE 1S1555
D501	8-719-906-58	DIODE GL-5HD21
D502	8-719-906-58	DIODE GL-5HD21
D503	8-719-906-58	DIODE GL-5HD21
D504	8-719-906-58	DIODE GL-5HD21
D506	8-719-815-55	DIODE 1S1555
D507	8-719-815-55	DIODE 1S1555
D508	8-719-815-55	DIODE 1S1555
D509	8-719-815-55	DIODE 1S1555
D601 △ 8-719-200-02	DIODE 10E-2	
D602 △ 8-719-200-02	DIODE 10E-2	
D603 △ 8-719-510-01	DIODE SIRBA10	
D701	8-719-815-55	DIODE 1S1555
D702	8-719-815-55	DIODE 1S1555
D703	8-719-815-55	DIODE 1S1555
D704	8-719-815-55	DIODE 1S1555
D705	8-719-815-55	DIODE 1S1555
D706	8-719-815-55	DIODE 1S1555
D707	8-719-815-55	DIODE 1S1555
D708	8-719-815-55	DIODE 1S1555
D709	8-719-815-55	DIODE 1S1555
D710	8-719-815-55	DIODE 1S1555
D711	8-719-815-55	DIODE 1S1555
D712	8-719-815-55	DIODE 1S1555
D713	8-719-815-55	DIODE 1S1555
D714	8-719-815-55	DIODE 1S1555
D715	8-719-815-55	DIODE 1S1555
D716	8-719-815-55	DIODE 1S1555
D717	8-719-815-55	DIODE 1S1555
H101	8-719-800-17	DIODE THS102A
H102	8-719-800-17	DIODE THS102A
H401	8-719-800-17	DIODE THS102A

ELECTRICAL PARTS

Ref. No.	Part No.	Description
IC101	8-759-602-65	IC CX-065B
IC102	8-759-145-58	IC UPC4558C
IC103	8-759-145-58	IC UPC4558C
IC301	8-759-800-22	IC LM6402H-194
IC302	8-759-145-58	IC UPC4558C
IC303	8-759-145-58	IC UPC4558C
IC304	8-759-145-58	IC UPC4558C
IC305	8-759-145-58	IC UPC4558C
IC401	8-759-145-58	IC UPC4558C
IC501	8-759-600-35	IC M54940P
IC701	8-759-140-17	IC UPD4017BC
IC702	8-759-240-01	IC TC4001BP
IC703	8-759-240-01	IC TC4001BP
J901	1-507-813-00	JACK
M901	1-541-219-00	MOTOR, LOADING
M902	1-541-218-00	MOTOR, ARM
PM401	1-454-344-00	SOLENOID, PLUNGER; ARM UP/DOWN
Q101	8-729-701-52	TRANSISTOR 2SA1025
Q102	8-729-245-83	TRANSISTOR 2SC2458
Q103	8-729-141-43	TRANSISTOR 2SD414
Q104	8-729-154-83	TRANSISTOR 2SB548
Q105	8-729-141-43	TRANSISTOR 2SD414
Q106	8-729-154-83	TRANSISTOR 2SB548
Q201	8-729-141-43	TRANSISTOR 2SD414
Q202	8-729-141-43	TRANSISTOR 2SD414
Q203	8-729-900-30	TRANSISTOR DTA144EF
Q204	8-729-802-34	TRANSISTOR 2SD1388
Q205	8-729-245-83	TRANSISTOR 2SC2458
Q206	8-729-141-43	TRANSISTOR 2SD414
Q207	8-729-245-83	TRANSISTOR 2SC2458
Q208	8-729-245-83	TRANSISTOR 2SC2458
Q209	8-729-900-33	TRANSISTOR DTC144EF
Q210	8-729-154-83	TRANSISTOR 2SB548
Q211	8-729-154-83	TRANSISTOR 2SB548
Q301	8-729-201-52	TRANSISTOR 2SA1015
Q302	8-729-900-33	TRANSISTOR DTC144EF
Q303	8-729-802-22	TRANSISTOR 2SB1014
Q304	8-729-900-33	TRANSISTOR DTC144EF
Q305	8-729-900-33	TRANSISTOR DTC144EF
Q306	8-729-900-33	TRANSISTOR DTC144EF
Q307	8-729-141-43	TRANSISTOR 2SD414
Q308	8-729-154-83	TRANSISTOR 2SB548
Q309	8-729-141-43	TRANSISTOR 2SD414
Q310	8-729-154-83	TRANSISTOR 2SB548

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CAPACITORS:

MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms.
- F : nonflammable

COILS

- MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
 UA...: μA..., UPA...: μPA..., UPC...: μPC,
 UPD...: μPD...

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 Replace only with part number specified.

ELECTRICAL PARTS

Ref. No.	Part No.	Description
Q311	8-729-900-30	TRANSISTOR DTA144EF
Q312	8-729-201-52	TRANSISTOR 2SA1015
Q313	8-729-900-30	TRANSISTOR DTA144EF
Q314	8-729-201-52	TRANSISTOR 2SA1015
Q315	8-729-224-61	TRANSISTOR 2SK246
Q319	8-729-900-33	TRANSISTOR DTC144EF
Q401	8-729-900-78	TRANSISTOR PT-430
Q402	8-729-900-78	TRANSISTOR PT-430
Q403	8-719-907-32	DIODE GP-1L04
Q404	8-719-411-28	DIODE ON1128
Q405	1-806-664-11	PHOTO COUPLER (REFLECTION TYPE)
Q406	8-729-201-53	TRANSISTOR 2SA1015
Q407	8-729-201-53	TRANSISTOR 2SA1015
Q408	8-729-201-53	TRANSISTOR 2SA1015
Q409	8-729-245-83	TRANSISTOR 2SC2458
Q410	8-729-900-33	TRANSISTOR DTC144EF
Q411	8-729-245-83	TRANSISTOR 2SC2458
Q412	8-729-245-83	TRANSISTOR 2SC2458
Q701	8-729-900-33	TRANSISTOR DTC144EF
Q702	8-729-245-83	TRANSISTOR 2SC2458
Q703	8-729-900-33	TRANSISTOR DTC144EF
Q704	8-729-900-33	TRANSISTOR DTC144EF
Q705	8-729-900-33	TRANSISTOR DTC144EF
R101	1-247-807-00	CARBON 100 5% 1/6W
R102	1-247-887-00	CARBON 220K 5% 1/6W
R103	1-247-825-00	CARBON 560 5% 1/6W
R104	1-247-825-00	CARBON 560 5% 1/6W
R105	1-247-869-00	CARBON 39K 5% 1/6W
R106	1-247-855-00	CARBON 10K 5% 1/6W
R107	1-214-767-00	METAL 39K 1% 1/4W
R108	1-214-779-00	METAL 120K 1% 1/4W
R109	1-247-855-00	CARBON 10K 5% 1/6W
R110	1-247-847-00	CARBON 4.7K 5% 1/6W
R111	1-247-847-00	CARBON 4.7K 5% 1/6W
R112	1-247-855-00	CARBON 10K 5% 1/6W
R113	1-247-815-00	CARBON 220 5% 1/6W
R114	1-247-843-00	CARBON 3.3K 5% 1/6W
R115	1-247-893-00	CARBON 390K 5% 1/6W
R116	1-247-843-00	CARBON 3.3K 5% 1/6W
R117	1-247-895-00	CARBON 470K 5% 1/6W
R118	1-247-895-00	CARBON 470K 5% 1/6W
R119	1-247-843-00	CARBON 3.3K 5% 1/6W
R120	1-247-893-00	CARBON 390K 5% 1/6W
R121	1-247-843-00	CARBON 3.3K 5% 1/6W

ELECTRICAL PARTS

Ref. No.	Part No.	Description
R122	1-247-895-00	CARBON 470K 5% 1/6W
R123	1-247-815-00	CARBON 220 5% 1/6W
R124	1-247-815-00	CARBON 220 5% 1/6W
R125	1-247-895-00	CARBON 470K 5% 1/6W
R126	1-247-903-00	CARBON 1M 5% 1/6W
R127	1-247-881-00	CARBON 120K 5% 1/6W
R201	△-1-212-849-00	FUSIBLE 4.7 5% 1/4W F
R202	△-1-217-399-00	FUSIBLE 100 5% 1/4W F
R203	△-1-212-867-00	FUSIBLE 27 5% 1/4W F
R204	△-1-212-876-00	FUSIBLE 62 5% 1/4W F
R205	1-247-833-00	CARBON 1.2K 5% 1/6W
R206	1-247-783-00	CARBON 10 5% 1/6W
R207	1-247-855-00	CARBON 10K 5% 1/6W
R208	1-247-787-00	CARBON 15 5% 1/6W
R209	1-247-853-00	CARBON 8.2K 5% 1/6W
R210	1-247-855-00	CARBON 10K 5% 1/6W
R211	1-247-847-00	CARBON 4.7K 5% 1/6W
R212	1-247-855-00	CARBON 10K 5% 1/6W
R213	1-247-855-00	CARBON 10K 5% 1/6W
R214	1-247-867-00	CARBON 33K 5% 1/6W
R215	1-247-843-00	CARBON 3.3K 5% 1/6W
R216	1-246-475-00	CARBON 1.2K 5% 1/4W
R217	△-1-212-876-00	FUSIBLE 62 5% 1/4W F
R218	△-1-212-867-00	FUSIBLE 27 5% 1/4W F
R219	1-247-785-00	CARBON 12 5% 1/6W
R220	△-1-212-849-00	FUSIBLE 4.7 5% 1/4W F
R301	1-247-903-00	CARBON 1M 5% 1/6W
R302	1-247-891-00	CARBON 330K 5% 1/6W
R303	1-247-903-00	CARBON 1M 5% 1/6W
R304	1-247-903-00	CARBON 1M 5% 1/6W
R305	1-247-847-00	CARBON 4.7K 5% 1/6W
R306	1-247-851-00	CARBON 6.8K 5% 1/6W
R307	1-247-807-00	CARBON 100 5% 1/6W
R308	1-247-867-00	CARBON 33K 5% 1/6W
R309	1-247-848-00	CARBON 5.1K 5% 1/6W
R310	1-247-855-00	CARBON 10K 5% 1/6W
R311	1-247-855-00	CARBON 10K 5% 1/6W
R312	1-247-903-00	CARBON 1M 5% 1/6W
R313	1-247-867-00	CARBON 33K 5% 1/6W
R315	1-247-855-00	CARBON 10K 5% 1/6W
R316	1-247-851-00	CARBON 6.8K 5% 1/6W
R317	1-247-807-00	CARBON 100 5% 1/6W
R318	1-247-879-00	CARBON 100K 5% 1/6W
R319	1-247-847-00	CARBON 4.7K 5% 1/6W
R320	1-247-847-00	CARBON 4.7K 5% 1/6W
R321	1-244-849-00	CARBON 100 5% 1/2W

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CAPACITORS:

MF: μ F, PF: $\mu\mu$ F.

RESISTORS

- All resistors are in ohms.
- F : nonflammable

COILS

- MMH : mH, UH : μ H

SEMICONDUCTORS

In each case, U : μ , for example:
 UA...: μ A..., UPA...: μ PA..., UPC...: μ PC,
 UPD...: μ PD...

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ELECTRICAL PARTS

Ref. No.	Part No.	Description				
R322	1-247-852-00	CARBON	7.5K	5%	1/6W	
R323	1-247-857-00	CARBON	12K	5%	1/6W	
R324	1-247-855-00	CARBON	10K	5%	1/6W	
R325	1-247-877-00	CARBON	82K	5%	1/6W	
R326	1-247-855-00	CARBON	10K	5%	1/6W	
R327	1-247-879-00	CARBON	100K	5%	1/6W	
R328	1-247-889-00	CARBON	270K	5%	1/6W	
R329	1-247-889-00	CARBON	270K	5%	1/6W	
R330	1-247-855-00	CARBON	10K	5%	1/6W	
R331	1-247-891-00	CARBON	330K	5%	1/6W	
R332	1-247-855-00	CARBON	10K	5%	1/6W	
R333	1-247-891-00	CARBON	330K	5%	1/6W	
R334	1-247-887-00	CARBON	220K	5%	1/6W	
R335	1-247-815-00	CARBON	220	5%	1/6W	
R336	1-247-815-00	CARBON	220	5%	1/6W	
R337	1-247-884-00	CARBON	160K	5%	1/6W	
R338 Δ	1-212-849-00	FUSIBLE	4.7	5%	1/4W F	
R339 Δ	1-212-875-00	FUSIBLE	56	5%	1/4W F	
R340 Δ	1-212-849-00	FUSIBLE	4.7	5%	1/4W F	
R341 Δ	1-212-875-00	FUSIBLE	56	5%	1/4W F	
R343	1-247-879-00	CARBON	100K	5%	1/6W	
R344	1-247-887-00	CARBON	220K	5%	1/6W	
R345	1-247-887-00	CARBON	220K	5%	1/6W	
R346	1-247-855-00	CARBON	10K	5%	1/6W	
R347	1-247-855-00	CARBON	10K	5%	1/6W	
R348	1-247-879-00	CARBON	100K	5%	1/6W	
R349	1-247-867-00	CARBON	33K	5%	1/6W	
R350	1-247-833-00	CARBON	1.2K	5%	1/6W	
R351	1-247-867-00	CARBON	33K	5%	1/6W	
R352	1-247-865-00	CARBON	27K	5%	1/6W	
R353	1-247-867-00	CARBON	33K	5%	1/6W	
R354	1-247-879-00	CARBON	100K	5%	1/6W	
R355	1-247-855-00	CARBON	10K	5%	1/6W	
R356	1-247-855-00	CARBON	10K	5%	1/6W	
R357	1-247-855-00	CARBON	10K	5%	1/6W	
R358	1-247-855-00	CARBON	10K	5%	1/6W	
R359	1-247-855-00	CARBON	10K	5%	1/6W	
R360	1-247-867-00	CARBON	33K	5%	1/6W	
R361	1-247-865-00	CARBON	27K	5%	1/6W	
R362	1-247-879-00	CARBON	100K	5%	1/6W	
R363	1-247-861-00	CARBON	18K	5%	1/6W	
R364	1-247-861-00	CARBON	18K	5%	1/6W	
R365	1-247-861-00	CARBON	18K	5%	1/6W	
R366	1-247-847-00	CARBON	4.7K	5%	1/6W	
R367	1-247-847-00	CARBON	4.7K	5%	1/6W	

ELECTRICAL PARTS

Ref. No.	Part No.	Description				
R368	1-247-847-00	CARBON	4.7K	5%	1/6W	
R369	1-247-825-00	CARBON	560	5%	1/6W	
R370	1-247-813-00	CARBON	180	5%	1/6W	
R371	1-247-810-00	CARBON	130	5%	1/6W	
R372	1-247-822-00	CARBON	430	5%	1/6W	
R373	1-247-861-00	CARBON	18K	5%	1/6W	
R374	1-247-855-00	CARBON	10K	5%	1/6W	
R375	1-247-855-00	CARBON	10K	5%	1/6W	
R376	1-247-825-00	CARBON	560	5%	1/6W	
R377	1-247-825-00	CARBON	560	5%	1/6W	
R378	1-247-825-00	CARBON	560	5%	1/6W	
R379	1-247-825-00	CARBON	560	5%	1/6W	
R381	1-247-831-00	CARBON	1K	5%	1/6W	
R382	1-247-831-00	CARBON	1K	5%	1/6W	
R383	1-247-831-00	CARBON	1K	5%	1/6W	
R384	1-247-831-00	CARBON	1K	5%	1/6W	
R385	1-247-831-00	CARBON	1K	5%	1/6W	
R386	1-247-815-00	CARBON	1K	5%	1/6W	
R387	1-247-815-00	CARBON	220	5%	1/6W	
R388	1-247-815-00	CARBON	220	5%	1/6W	
R389	1-247-815-00	CARBON	220	5%	1/6W	
R390	1-247-831-00	CARBON	1K	5%	1/6W	
R391	1-247-815-00	CARBON	220	5%	1/6W	
R392	1-247-815-00	CARBON	220	5%	1/6W	
R393	1-247-815-00	CARBON	220	5%	1/6W	
R394	1-247-815-00	CARBON	220	5%	1/6W	
R395	1-247-847-00	CARBON	4.7K	5%	1/6W	
R396	1-247-852-00	CARBON	7.5K	5%	1/6W	
R397	1-247-865-00	CARBON	27K	5%	1/6W	
R398	1-247-810-00	CARBON	130	5%	1/6W	
R399	1-247-881-00	CARBON	120K	5%	1/6W	
R401	1-247-823-00	CARBON	470	5%	1/6W	
R402	1-247-855-00	CARBON	10K	5%	1/6W	
R403	1-247-861-00	CARBON	18K	5%	1/6W	
R404	1-247-857-00	CARBON	12K	5%	1/6W	
R405	1-247-879-00	CARBON	100K	5%	1/6W	
R406	1-247-879-00	CARBON	100K	5%	1/6W	
R407	1-247-879-00	CARBON	100K	5%	1/6W	
R408	1-244-852-00	CARBON	130	5%	1/2W	
R409	1-247-834-00	CARBON	1.3K	5%	1/6W	
R410	1-247-833-00	CARBON	1.2K	5%	1/6W	
R411	1-247-855-00	CARBON	10K	5%	1/6W	
R412	1-247-887-00	CARBON	220K	5%	1/6W	
R413	1-247-867-00	CARBON	33K	5%	1/6W	
R414	1-247-847-00	CARBON	4.7K	5%	1/6W	

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COILS

MMH : mH, UH : μ H

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In each case, U : μ , for example:UA...: μ A..., UPA...: μ PA..., UPC...: μ PC,UPD...: μ PD...

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ELECTRICAL PARTS

Ref. No.	Part No.	Description			
R415	1-247-843-00	CARBON	3.3K	5%	1/6W
R416	1-247-843-00	CARBON	3.3K	5%	1/6W
R417	1-247-839-00	CARBON	2.2K	5%	1/6W
R418	1-247-839-00	CARBON	2.2K	5%	1/6W
R419	1-247-891-00	CARBON	330K	5%	1/6W
R420	1-247-854-00	CARBON	9.1K	5%	1/6W
R421	1-247-855-00	CARBON	10K	5%	1/6W
R422	1-247-855-00	CARBON	10K	5%	1/6W
R423	1-247-867-00	CARBON	33K	5%	1/6W
R424	1-247-853-00	CARBON	8.2K	5%	1/6W
R425	1-247-879-00	CARBON	100K	5%	1/6W
R426	1-247-851-00	CARBON	6.8K	5%	1/6W
R427	1-247-867-00	CARBON	33K	5%	1/6W
R501	1-246-509-00	CARBON	33K	5%	1/4W
R502	1-246-509-00	CARBON	33K	5%	1/4W
R503	1-246-449-00	CARBON	100	5%	1/4W
R701	1-247-863-00	CARBON	22K	5%	1/6W
R702	1-247-867-00	CARBON	33K	5%	1/6W
R703	1-247-867-00	CARBON	33K	5%	1/6W
R704	1-247-855-00	CARBON	10K	5%	1/6W
R705	1-247-867-00	CARBON	33K	5%	1/6W
R706	1-247-855-00	CARBON	10K	5%	1/6W
R707	1-247-863-00	CARBON	22K	5%	1/6W
R708	1-247-855-00	CARBON	10K	5%	1/6W
R709	1-247-887-00	CARBON	220K	5%	1/6W
R710	1-247-867-00	CARBON	33K	5%	1/6W
R711	1-247-867-00	CARBON	33K	5%	1/6W
R712	1-247-887-00	CARBON	220K	5%	1/6W
R713	1-247-887-00	CARBON	220K	5%	1/6W
RV101	1-228-238-00	RES, ADJ, METAL GLAZE 20K			
RV102	1-228-239-00	RES, ADJ, METAL GLAZE 50K			
RV103	1-226-234-00	RES, ADJ, CARBON 2K			
RV104	1-226-234-00	RES, ADJ, CARBON 2K			
RV105	1-226-235-00	RES, ADJ, CARBON 5K			
RV106	1-226-235-00	RES, ADJ, CARBON 5K			
RV301	1-224-134-XX	RES, ADJ, METAL GLAZE 470K			
RV302	1-224-256-XX	RES, ADJ, METAL GLAZE 220K			
RY401	1-515-323-00	RELAY			

ELECTRICAL PARTS

Ref. No.	Part No.	Description
S1	1-553-909-00	SWITCH, PUSH, POWER
S2	1-554-483-00	SWITCH, ARM REST
S3	1-554-205-00	SWITCH, PUSH, OPEN
S4	1-554-205-00	SWITCH, PUSH, CLOSE
S5	1-553-324-00	SWITCH, ROTARY, DP ADJUST
S6	1-552-915-00	SWITCH, SLIDE, SENSITIVITY
S501	1-554-303-00	SWITCH, KEY BOARD
S502	1-554-303-00	SWITCH, KEY BOARD
S503	1-554-303-00	SWITCH, KEY BOARD
S504	1-554-303-00	SWITCH, KEY BOARD
S505	1-554-303-00	SWITCH, KEY BOARD
S506	1-554-303-00	SWITCH, KEY BOARD
S507	1-554-303-00	SWITCH, KEY BOARD
S508	1-554-303-00	SWITCH, KEY BOARD
S509	1-554-303-00	SWITCH, KEY BOARD
S510	1-554-303-00	SWITCH, KEY BOARD
S511	1-554-303-00	SWITCH, KEY BOARD
S512	1-554-303-00	SWITCH, KEY BOARD
S513	1-554-303-00	SWITCH, KEY BOARD
S514	1-554-303-00	SWITCH, KEY BOARD
S515	1-554-303-00	SWITCH, KEY BOARD
S516	1-554-303-00	SWITCH, KEY BOARD
S517	1-554-303-00	SWITCH, KEY BOARD
S518	1-554-303-00	SWITCH, KEY BOARD
T901Δ	1-446-851-00	(E).....TRANSFORMER, POWER
T901Δ	1-447-124-00	(AEP,UK).....TRANSFORMER, POWER
X301	1-527-895-00	OSCILLATOR, CERAMIC

NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked "Δ" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:

MF:μF, PF:μμF.

RESISTORS

- All resistors are in ohms.
- F : nonflammable

COILS

MMH : mH, UH : μH

SEMICONDUCTORS

In each case, U : μ, for example:
 UA...: μA..., UPA...: μPA..., UPC...: μPC,
 UPD...: μPD...

The components identified by shading and mark Δ are critical for safety. Replace only with part number specified.